CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

DEPARTMENT OF COMPUTER SCIENCE

4TH YEAR PROJECT SHOW 2017

Architecture Factory - May 10th - 16:00 - 18:30

I'm delighted to invite you to the 4th year Project Show 2017 for the Department of Computer Science at Cork Institute of Technology. The show will be held on Wednesday May 10th from 16:00 to 18:30 in the Architecture Factory, Melbourn Building, Bishopstown Campus.

On display will be final year project poster presentations by students from our honours degree programmes. These projects demonstrate the quality of CIT Computer Science graduates and their ability to solve real world problems.

Please join us on the day for what promises to be a great celebration of our students' achievements.

Tim Horgan, Head of Department

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Student Name: George O'Donnell	**Supervisor:** Dr Ted Scully
Project Title: Comparative Application for Text Similarity Algorithms	
Research Question: How can we reliably measure the similarity between two passages of text?	
Project Abstract: The objective of this project is to create functional software that will perform a comparative analysis between a range of text similarity algorithms. The application will involve the implementation and testing of text similarity algorithms on a training dataset. The test dataset consists of 5800 sentence pairs that have been extracted from news sources on the web, along with human annotations indicating whether each pair captures a paraphrase/semantic equivalence relationship. The application will use individual algorithms to determine the similarity of these sentence pairs, and then combine the results of all implemented algorithms to determine similarity. This will allow for a comparative look at how each algorithm can improve or impact the possible outcome when paired with other algorithms, enabling us to assess the advantages and disadvantages of using certain similarity algorithms together.	
Technologies used: Python	
Class: BSc(Hons) Software Development	

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Student Name: David Good	**Supervisor:** Mary Davin
Project Title: Emergency Volunteer Dispatch and Management System.	
Research Question: Can the management and dispatching of second-line voluntary emergency services be made more efficient through the use of web and mobile applications?	
Project Abstract: Second line emergency services are called upon to assist the statutory agencies in times of severe weather incidents and in large search and rescue operations. Currently there is no system in place for dispatching second-line services such as the Civil Defence. This can lead to a delayed response time from emergency volunteers. This project will aim to increase the response time and level of response from a voluntary agency, such as the Civil Defence during normal daytime hours and in particular during the night when phones are generally on silent. This project has two separate applications that work together to increase efficiency. A web application provides a management console for the officer in charge to manage his/her volunteer team. The console allows access to a wide range of management options as well as the ability to trigger an urgent alert for a callout. The mobile application is intended to be installed on each volunteer's phone within the organisation. When a call goes out, the application will force the volunteer's phone out of silent and play a tone similar to that of a pager. This ensures the volunteers get the callout message and are then able to respond.	
Technologies used: HTML, CSS, JavaScript, Node.js, Firebase, Bootstrap, Java, NPM.	
Class: BSc(Hons) Web Development	

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Student Name: Kevin Maher	**Supervisor:** Dr Ted Scully

Project Title: CIT Carpool Mobile Application

Research Question:
Can an efficient carpool application be developed to help CIT students get to college?

Project Abstract:

Car parking facilities at CIT are frequently unable to accommodate the number of cars that arrive each morning. Anyone using the car parking facilities regularly will notice that a large proportion of the cars arriving contain only a single occupant. Therefore, it would seem that one solution to the shortage of parking spaces would be to use a carpool system. The aim of this project is to develop a mobile application which can facilitate and manage a carpool system for the students.

The application allows participating students to log in with their MyCIT email address and then create a profile to be used within the app. This includes entering a profile picture, name, address and car details, along with a start and finish time for each day of the week. The system implements an optimization algorithm that generates carpool groups for all the participating students. The application then informs each student of their carpool groups via notifications. The carpool group information is then downloaded, including profile information to help identify other group members as they will likely be strangers to each other. The user can view the groups route on a map and the driver is given the option to begin navigating the route with Google Maps. The mobile application also alerts passengers when the driver has begun driving and allows them to view the drivers progress on the map.

The most important part of the application is the generation of the carpool groups which required the development of an optimization algorithm. The algorithm considers several factors including the address, start time and finish time of each student, when generating the groups. For the algorithm to be effective it also aims to ensure each car has a minimum of two occupants where possible, but will ideally have three or more occupants. It also ensures the students will arrive at the college on time and that the drivers route is kept as short as possible. The varying start and finish times that students have because of their timetables adds further complexity. To address these issues and generate effective groups several optimization techniques were researched including particle swarm, ant colony and genetic algorithms. The implemented algorithm uses an ant colony optimization technique, an optimization technique based on the way ants find the shortest route between the nest and a food source. Using this algorithm the application is able to generate the effective carpool groups required.

Technologies used:
Android, Google Maps API's, Firebase, Bluemix, Cloudant, NodeJS, Python

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Class: BSc(Hons) Software Development

Student Name: William Barrett	**Supervisor:** Helen Fagan
Project Title: Build Shared Library Fuzzing Capabilities Into Software Development Automation Frameworks	
Research Question: I	
Project Abstract: In the information age, much of our daily routines and business practices revolve around technologies reliability and its security. While many development processes are being practiced and widely taught, it is still difficult to say that a software is defect/vulnerability free. While some defects may only be minor, others can result in loss of business, resources and even life. With practices in place having been proven effective, there is always room for improvement. Fuzz Testing or Fuzzing is an automated technique used to detect errors and loopholes in software. Fuzzing tests a software's boundaries and validation using invalid data in a variety of different ways (File Formats, API calls, Network Protocols, Inputs and more). In real world applications, these input vectors can become spoiled to cause failure. This can happen naturally via relative context noise, or intentionally by a malicious third party. Fuzzing has captured the attention of many industry leaders and now holds a place in the software development life-cycle. However, it requires its own place away from systems integration/unit testing. The purpose of this project is to assess a means of integrating fuzzing with software automation frameworks. The focus will be placed on shared library fuzzing, due to a lack of lightweight solutions available. Typically, to reap the benefits of shared library fuzzing, one would have to download whole fuzzing suites. This can cause clutter and specialized knowledge is necessary. The solution will provide an easy to use, easy to integrate shared library fuzzer that requires minimal training. By providing this solution I hope to make the benefits of fuzzing more appealing and cost effective.	
Technologies used: Python, c++, ctypes, Pycharm, Visual Studio	
Class: BSc(Hons) Software Development	

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Student Name: Robert O'Riordan	**Supervisor:** Dr Paul Davern
Project Title: Educational Video Game Used to Reduce Mental Illness Stigma	
Research Question: Is it possible to reduce stigma towards those suffering from mental illness using an educational video game?	

Project Abstract:

Ireland currently faces a large mental health problem. A recent study done by the Royal College of Surgeons reveals that Irish youth have a higher rate of mental health problems than that of their peers in Europe and the USA. On top of this problem, another more recent study by St. Patricks Mental Health Services reveals that large percentages of people in Ireland think that mental illness sufferers are untrustworthy and view mental health difficulty as a sign of personal failure.

My project seeks to partially address this issue of mental illness stigma in Ireland by developing a narrative-focused video game intended to subtly educate a younger audience on the importance of being supportive to a friend suffering from mental illness. In the game, players are placed in the role of a teenaged character who travels to a fictional, Irish, island community to visit their uncle for a brief period. While helping your uncle with simple, chore-like tasks around the island, you are reintroduced to an old friend from your childhood. Through a variety of unique interactions with this character, players take part in conversations, both in person and via phone messaging, in which they can make specific choices of what to say to this friend, ranging from positive to negative. Positive responses improve their relationship with the character, leading to additional unique interactions where they learn more about the character's backstory and illness that they struggle with. Negative responses result in less interactions with the character, leaving the player to spend most of their time working on the uninteresting tasks assigned by your uncle.

Technologies used:
Godot Game Engine, GDScript, Inklewriter

Class: BSc(Hons) Software Development

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Student Name: Eilish O'Tuama	**Supervisor:** Dr Paul Davern
Project Title: Over Here! – Incident and Location Monitoring System	
Research Question: Can incident reaction time and location tracking for rural and/or elderly individuals be improved through the use of an Android device, without the need for external sensors?	
Project Abstract: Currently in Ireland many rural areas have low emergency response times and it can be very difficult for emergency units to pinpoint the exact location where incidents have occurred. The target response time for an ambulance responding to a life-threatening situation currently stands at 8 minutes. In Ireland last year only 26.6% of emergency calls were responded to within that target time and this drops to 6.6% when dealing with rural areas. Using this system, precise information can be sent at the time of an incident to predefined contacts or emergency services to improve the chances of hitting target response times, thus increasing people's chances of survival from their injuries. This project also addresses the issue of being able to track individuals whose current location is unknown, particularly those who cannot be relied upon for information, such as Alzheimer's and Dementia sufferers, who may have forgotten their surroundings. Currently, studies show that 6 out of 10 people with Dementia will wander and then become disoriented with their surroundings. This can become dangerous if they are in an unfamiliar setting and cannot be found quickly which can cause great distress for the individual's family and loved ones. All this information is supported by a cloud-based web application where the user's event information, current location and movements can be viewable for analysis.	
Technologies used: Android, Spring Boot, Heroku, PostgreSQL, Google Maps, HighCharts	
Class: BSc(Hons) Software Development	

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Student Name: Dara Shorten	**Supervisor:** Dr Paul Davern
Project Title: Microservices Development and Orchestration	
Research Question: Develop a web based application with a microservice architecture using the Twitter API to geographically display tweets.	
Project Abstract: In the modern era people post the vast majority of their opinions on social media such as Facebook and Twitter. This application geographically represents people's tweets. The application is developed with a microservice architecture. The application searches for tweets on a particular topic using the Twitter API and display them on a map. The final web dashboard presents an interactive world map showing the locations of tweets on that topic. After a design phase, where all the needed micro-services must be identified and specified, each microservice will be implemented separately, preferably using at least two different languages or frameworks in order to demonstrate their isolation. The use of Docker will help with continuous delivery of this application it also allows for easy portability across operating systems. The biggest factor for choosing Docker is the ease of scalability. The backend of this application will have to deal with thousands of different tweets under different terms. Being able to scale up and down easily is extremely useful for such an application. The use of micro-services will allow extra resources being allocated to certain parts of the application. Unlike a monolithic service micro-services will allow the allocation of extra resources to certain parts of the project such as scraping the Twitter API for tweets of a desired topic. A major benefit of microservices is that if one micro-service fails during runtime only the function of that micro-service is impacted. It may interfere with a certain part of the application, however as a whole it doesn't completely take down the entire application. With an application that has such a heavy workload the use of micro-services is vital to provide a good user experience.	
Technologies used: Docker, Node.js, NPM, Java, JQuery, Eureka, MongoDB, Google Maps, Bootstrap	
Class: BSc(Hons) Software Development	

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Student Name: Alan Sheehan	**Supervisor:** Dr John Creagh
Project Title: Home Monitoring & Automation System with the Internet of Things	
Research Question: Can the Internet of Things be used to automate and monitor a household?	
Project Abstract: The Internet of Things has rapidly become one of the most talked about technologies in recent years. The Internet of Things, or IoT for short, is defined as the interconnection, via the internet, of computing devices embedded in everyday objects, enabling them to send and receive data. IoT has paved the way for a wide range of new application possibilities, including environmental monitoring, infrastructure & energy management, automation and more. The objective of this project was to explore the application of the Internet of Things in a household. The aim is to develop a home automation system which would improve the homeowner's quality of life. A number of Raspberry Pi computers are deployed in a household, equipped with various sensors and actuators, which enable real-time monitoring as well as automation of some day-to-day tasks in the house. The implementation focused on three main aspects of the modern home – temperature monitoring & control, security and produce management. This functionality is provided by a sensor board, camera and weighing scale respectively. The result is a home management system with a central point of control: an Android smartphone application.	
Technologies used: Java, Python, Spring, Internet of Things, Android Development, MQTT, Linux & Hardware	
Class: BSc(Hons) Software Development	

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Student Name: Monika Hajkova	**Supervisor:** Dr John Creagh

Project Title: Dynamic Blacklisting Based on an IP Reputation Database

Research Question:
How can you blacklist IP addresses based on their reputation in IBM's X- Force database?

Project Abstract:

Technology has become a big part of people's everyday life. Majority of the devices can connect to the Internet with their MAC address and an IP address. The two addresses work together as a passport when accessing the Internet over the standard communication method, TCP/IP protocol. While MAC addresses are unique to each device and should never change, the IP address can either be static or dynamic. Because IP addresses can change, depending on the network you are connected to, it is becoming increasingly difficult for security administrators to monitor and blacklist IP addresses from malicious sites, botnets, or command and control servers. If the administrators were to blacklist such IP addresses, it may result in blocking genuine users or services.

Currently, IBM have a team of security professionals called X-Force Research. These security professionals monitor and analyse security issues from a variety of sources, providing threat intelligence content. Part of the X-Force API is an IP reputation database.
The proposed solution is a process that would blacklist an IP address after verifying its reputation in the X-Force database, and would re-authorise it as soon as it is deemed acceptable again. This would bring extra protection to a web server without having the undesirable side effects. Once an IP address has gone through that cycle, it can be considered being in a grey area. This means that even if it was considered clean, it would still be checked on a regular basis to make sure it hasn't been used by some malicious software again. This allows you to take some measures against that IP before it hits the web server.

Technologies used:
Python, X-Force, ELK, WordPress, Nginx, Apache

Class: BSc(Hons) Software Development

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Student Name: Joel Satkauskas	**Supervisor:** Dr John Creagh

Project Title: A Statistical Analytical Solution for Retailer Receipts

Research Question:
Can we gather data on people's receipts to get a better insight to their shopping habits?

Project Abstract:

SNIPP has many programs were they reward consumers for certain products bought. They collect a lot of receipts from users but only use them to confirm that a certain product was purchased. There is a large potential here for big-data gathering and using that data to display analytic information to SNIPP's clients.

Receipts have a lot of information in them and can give a good insight into consumers and their shopping habits. Product producers could greatly benefit from this information as the only other alternative is paying the retailer for this data.

This project explores the idea of using optical character recognition to read the receipts that are submitted by consumers and gather statistics from them. The data would be extracted and then be displayed to the user using the Google Maps and Charts API as its main means. These statistics can be anything from gender ratio of consumers, to days of the year that a certain product is most bought.

Technologies used:
C#, ASP.NET MVC, MongoDB, Tesseract OCR, Google Charts API, Google Maps API, Angualr.js, Typescript, JavaScript, Html, CSS, Git, Visual Studio, JQuery, ISS, AJAX.

Class: BSc (Hons) Software Development

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Student Name: Dave Kavanagh	**Supervisor:** Dr John Creagh
Project Title: Optical Character Recognition for Betting Point of Sale Systems	
Research Question: Can Optical Character Recognition be effectively utilised to automate the process of accepting paper bets in a Bookmakers?	
Project Abstract: This project aims to serve as a proof of concept (PoC), that optical character recognition (OCR) could be employed to effectively enhance common business practice in retail betting environments. The problem addressed is that of "translating" bets, a specific use case that is triggered by the event of a customer placing a bet in a betting shop. When a bet is placed in store, a customer writes the bet on paper and hands it to the betting assistant, who then scans the bet upon which point an image of the bet is added to a queue, in the bet management system, of bets that need to be "translated". This translation is manual data entry, whereby the contents of the bet as written on the betting slip are typed up and saved in the bet management system. This PoC aims to exhibit that OCR can alleviate the workload caused by the need to translate bets, by extracting text from betting slip images and recording the data automatically in the betting management system. The above detailed proof of concept is incorporated in a web-application that consists of full bet, race, customer and user management capabilities, and a mobile betting application has also been developed that interfaces with the betting management system.	
Technologies used: OCR, Python, Java, Spring, jQuery, Ajax, MySQL, Android	
Class: BSc(Hons) Software Development	

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Student Name: Yuliya Verbishchuk	**Supervisor:** David Murphy

Project Title: Demonstration of software defined control of whitebox Reconfigurable Optical Add Drop Multiplexers (ROADMs)

Research Question:
How to achieve precise control of whitebox optical ROADMs using software defined techniques?

Project Abstract:

Software defined networks (SDN) is an emerging paradigm which is changing the way networks and data centres are built, maintained and operated at scale. SDN separates the control plane and data plane; forwarding state in the data plane is programmed and configured with a controller.

SDN techniques are well-advanced on packet-based forwarding devices, i.e. Layer 2 Ethernet switches deployed within warehouse scale data centres. They are less advanced with optical switches that work by receiving and emitting optical carriers, i.e. colours of light that may contain data packets.

The project will develop methods to control and switch an incoming set of optical carriers to a set of output ports. This will allow the controller to dynamically control the ROADM and choose what signal to be multiplexed. It will also allow control of the power and gain of the signal. The whitebox optical ROADM device will use open software to program the forwarding function.

The project will help to improve bandwidth management and quality of service on optical fibres between locations in a telecommunications network. The use of ROADMs in optical transport networks provides the ability to easily turn up bandwidth through faster circuit provisioning and activation, simplified reconfiguration and reallocation of bandwidth and improved agility.

Technologies used:
YANG, NetConf, ONOS, Netopeer, Ubuntu Server

Class: BSc(Hons) IT Management

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Student Name: Robert Kowalczyk	**Supervisor:** David Murphy
Project Title: Technologies in Containerized Environments	
Research Question: How can containerization be used to test and deploy services?	
Project Abstract: Containerization is a method of Operating System level virtualization. It is a lightweight alternative to full system virtualization (i.e. system virtual machines) promising better utilization of resources. In the world of virtualization, there is space for improvements which can be provided by containerization, e.g. provisioning more resources at lower costs and overhead. Containerization has also gained significant popularity among developers as it provides easier application portability between different OS distributions. This project aims to deliver a containerized environment using trending technologies in the area, specifically Docker and Kubernetes. It will use a distribution based on the Ubuntu OS and deliver a scalable environment that can be centrally managed and monitored. Lastly, the project will incorporate a brief comparative analysis between containerization and full system virtualization (i.e. containerization versus VMs).	
Technologies used: Docker, Kubernetes, VMware Workstation, Ubuntu OS	
Class: BSc(Hons) IT Management	

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Student Name: Declan Cahill	**Supervisor:** David Murphy
Project Title: Hyper Converged Infrastructure - Keeping The Future Together.	
Research Question: How can hyper converged infrastructure help with the management of operations in a cloud environment?	
Project Abstract: There has been an information boom in the digital universe in recent years, with enormous amounts of information being produced, gathered and analysed daily. This information boom has been a significant contributing factor in the recent convergence of business and IT, with businesses increasingly dependent on IT systems, particularly cloud environments, for delivery of their operations and applications. Hyper Converged infrastructure (HCI) is a recent trend in cloud computing that allows extremely efficient management of resources in a cloud environment. According to Gartner, Inc., the area will be worth €5 Billion by 2019, clearly signaling HCI as the future for cloud computing.	
Technologies used: ESXi 6.0, VCSA 6.0, windows server 2012, converged infrastructure.	
Class: BSc(Hons) IT Management	

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Student Name: Orla Stanton	**Supervisor:** David Murphy
Project Title: An analysis of a private, on-premises virtual desktop solution for an Institute of Technology environment	
Research Question: Which VDI solution would be most suitable for an Institute of Technology environment and why?	
Project Abstract: The objective of this project is to identify the benefits of a virtual environment implementation in an Institute of Technology and to investigate the various virtual desktop infrastructure (VDI) technologies currently available. A comparative analysis of the virtual environments of two Institutes of Technology, namely CIT and DIT, was performed. The key metrics of interest include the variety and ease of use of desktops, and the resulting benefits to administration staff and students. Aspects to be investigated include the infrastructure and design, the software required, and the installation, administration and configuration of the environment. In summary, the project is an analysis of how an Institute of Technology could implement a virtual desktop solution, taking into account the specific requirements of an educational environment.	
Technologies used: VMware View 7, Cisco Servers, Microsoft images	
Class: BSc(Hons) IT Management	

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Student Name: Brian Hennessey	**Supervisor:** David Murphy
Project Title: Network Traffic Analyzer for a Pharmaceutical Plant	
Research Question: Will implementing a real-time network monitor prevent unplanned downtime due to network flooding?	
Project Abstract: The amount of data that is generated, used and stored in an Active Pharmaceutical Ingredient (API) plant is staggering. This could be anything from the temperature of a certain vat, to the status of one of the filter dryers, to the latest percentage yield produced by a batch of product. All of this data is carried across the Distributed Control System (DCS) of the plant. Each controller is connected via Ethernet to the plant network. DeltaV is the software that provides automation of the DCS in the plant in question. This project came about due to the lack of an identified service in plant operation. An error occurred recently in a plant DCS component causing the computer in question to flood the plant network with traffic. The error went unnoticed until the network shutdown under the strain of the traffic level, resulting in almost 48 hours of unplanned downtime. The primary goal of this project is to provide an application that can distribute alerts if a problem is occurring somewhere in the plant. Network traffic is constantly monitored and logged as necessary. Alerts are then propagated to relevant individuals should a specified threshold limit be broken for a certain period of time. These alerts contain information about the current network situation - for example, which devices are generating more traffic than usual.	
Technologies used: Eclipse, DeltaV, Jpcap, Install4j, Wireshark	
Class: BSc(Hons) Computer Systems	

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Student Name: Paul Foley	**Supervisor:** David Murphy
Project Title: Helpr	
Research Question: Creating a mobile application that allows children with language and/or communication disorders to easily communicate with their parent/guardian.	
Project Abstract: The application is designed to allow children with language and/or communication disorders to communicate with their parents/guardians via email and/or short message service (SMS). It also provides analytics which can be used by parents or medical professionals to identify trends or abnormalities in the child's behaviour and provide insight into the thoughts, feelings and needs of the child. Given that the anticipated end-user is a child with communication difficulties, usability is of central importance. The interface is based on a “one-click” methodology and is designed in a way which allows children to easily interpret the functionality of each button. The application is designed to be easy to use for both children and parents/guardians.	
Technologies used: Android, Java, XML, Firebase, Facebook, Google, SQLite, GraphView, GitHub, Dropbox, ProGuard, Samsung.	
Class: BSc(Hons) Computer Systems	

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Student Name: Rory Kelleher	**Supervisor:** David Murphy
Project Title: Internet of Things enhanced Digital Baby Monitor	
Research Question: Can new technology be applied to a nursery staple to increase functionality, satisfaction and peace of mind?	
Project Abstract: The overall goal of this project was to develop a unified system where a user can check on their child using existing technology in the home (as opposed to requiring a plethora of new devices). A Raspberry Pi based monitor will push all data to a fully functional and live website. The website will have support for all browsers and have dynamic scaling for mobile devices. This will enable it to be used on tablets and smartphones alike. There are to be three primary functions: 1. Video Stream: a solid video stream will be the cornerstone of the project. This will allow users/parents to check in on their baby from anywhere and any device. 2. Audio Stream: an audio feed to monitor for cries or issues. 3. Temperature/Humidity: two sensors to track temperature and humidity levels in the room. These functions will combine to create a system that will provide parents with a platform to check on their children without being grounded by a traditional receiver.	
Technologies used: HTML5, JavaScript, Python, PHP, Rasbian Jeese, Node.js, .mp3 livestream, .h264 video livestream.	
Class: BSc(Hons) Computer Systems	

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Student Name: Stephen Coveney	**Supervisor:** David Murphy
Project Title: Silent one click-based application for safety concerns	
Research Question: Can we create a silent and fast application to alert authorities in the case of any safety concern?	
Project Abstract: Unfortunately in this day and age, situations often arise where people's personnel safety is put in danger. Since smartphones have become so ubiquitous in society, a logical step is the development of a phone application to help users in situations such as these. The application will feature a location-based alert system, visualised via Google Maps. It will allow the user to authenticate themselves rapidly via their Google account credentials. The home page will show locations of ongoing alerts and a Google Map representation of their current location. A clearly represented icon will be available for the user to create their own alert. This alert will record the user's geolocation, together with details such as their name, phone number, etc., and send these to a real-time database which is monitored by the authorities. The user will be able to access further information on each alert listed by selecting it from the list. Selection of an alert will open another page with any relevant information from the authorities about the attack, together with a list of users that have declared themselves safe in that location (the functionality for a user to declare themselves safe will be provided within the app). The project will be developed using Android Studio in conjunction with a cloud based database to receive data from the application. Authentication of the user will be made using their Google account, connecting to the Gmail API. To find the geolocation of the user, the app will make use of the Google Maps API.	
Technologies used: Java, Android Studio, SQLite, NoSQL Database, JSON, Google Firebase, Google Authentication, Google Maps API, Gmail API.	
Class: BSc(Hons) Computer Systems	

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Student Name: Thomas O Halloran	**Supervisor:** Mary Davin

Project Title: Franchise Management System.

Research Question:
Could a management system improve the overall performance of a franchise business through content organisation and reporting?

Project Abstract:

This project is the development of a suite of applications that work together to create a Franchise Management System. This system provides a franchise business with a software solution to manage all locations within the franchise business. This system gives the franchise business the ability to rapidly expand by providing tools to create new business locations and to control the content that is shown to customers for each business location separately. To demonstrate the effectiveness a Franchise Management System the application developed is applied to a cinema franchise.

A cinema franchise consists of multiple locations with each location having unique content. Each location consists of a number of screens, a list of available movies, a movie show time schedule, and price lists. The nature of a cinema franchise is that their content changes regularly with new movie releases. With no content management system in place, the website/mobile app which is displaying the content would need to be updated regularly by software developers. All content related to each location can be modified through the content management application and when saved can be displayed on the mobile application without the need for software developers.

This system also includes an account management section to allow a franchise to add new managers and assign permissions related to their role. Franchise Manager and Location Manager are the roles available in this system. A franchise manager can control all content for all locations and can update the account management section whereas a location manager is assigned to a single location and can only edit content for that location.

To enhance this system I have also included a reporting and analytics section which can be used to monitor the performance of each location or the franchise as a whole. This functionality could assist a Franchise Manager to make crucial business decisions in relation to specific franchise locations with regard to their performance or lack thereof. It could drive investment to areas where a location is not performing or to a location that needs to expand.

Technologies used: Visual Studio, Android Studio, XCode, Angular JS, Javascript, HTML, CSS, Java, Python, Flask, SQLite, REST, HTTP

Class: BSc(Hons) Software Development

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Student Name: Declan Kelly	**Supervisor:** Eoin O'Regan
Project Title: First Letters - Learning to Write for Primary School Children	
Research Question: Can a mobile application be developed to aid a child in their initial steps towards learning to write?	
Project Abstract: With the proliferation of technology and the internet into almost all aspects of our everyday lives, children even of school starting age are readily familiar with smartphones and tablets. They already use them for playing games or watching videos, so this familiarity provides an opportunity to develop an app to aid children when they are learning to write. The aim of the project is to develop a mobile application that will allow a child to write letters on a touchscreen device with their finger (or stylus). The application will then be able to check if the letter matches correctly one of the 26 letters of the alphabet and give feedback to the child. It will be an important aspect that even if they get a letter wrong the app will encourage a child to try again. To this end a system of stars or other badges will be used to introduce a game feel to aid in the learning process. After a session, the app will save progress to preserve a child's score for the next time the child uses it. A child's progress report will also be possible to view by a parent or teacher to monitor progress. The app will also allow for the setting up of personalised tasks for the child such as letters that the child finds more difficult by a parent or teacher.	
Technologies used: Android, Java, Android Studio, SQLite. GSON, Gradle, Google Touch Gestures.	
Class: BSc(Hons) Computer Systems	

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Student Name: Isam Brahim	**Supervisor:** Eoin O'Regan

Project Title: Diabetic Management System as a Service

Research Question:
Can we create a mobile app allowing people to better take care of their diabetes?

Project Abstract:

Nowadays, Diabetes is widespread, affecting young, middle aged and older person from several continent around the globe. Diabetes has many side effects such as tiredness, excessive thirst, nausea, heart disease and stroke.
In order to control theses side effects and avoid any further complication, diabetes are required to monitor their blood glucose levels on daily basis, take medication to remedy their glucose levels and always avoid consuming drinks & foods with high sugar content.
Traditionally diabetics managing their condition using logbooks for daily input, text books for nutritional information however due to mobile apps ubiquitous on which this project is based, many of daily tasks necessary for diabetes can be combined into one primary source to increase the efficiency to manage and monitor their condition.
This Project's main goal is to develop an android app with the purpose of helping diabetics to manage their illness.
The management system aims to :

- ❏ Provide a simple interface for allowing daily input of diabetic glucose level, insulin or pills taken and comment spaces for user's important notes.
- ❏ Provide interface to enter person name, surname, age, height, mobile, doctor email, emergency contact, diabetic type and gender.
- ❏ Visualize all of diabetic's personal data, such as daily input which is saved to database, build up over time.
- ❏ Graphic view for glucose level with the option of select date to view.
- ❏ Acts as alert for users if he forget to take blood glucose levels.
- ❏ Send an alert email and message with user details and location in emergency when user need assistance.
- ❏ Store all his details and daily inputs in the cloud to view when he needed from any device when he login.
- ❏ Acts as a source of information, cutting out the need for tirelessly searching for required information elsewhere.

Technologies used:
Java, JavaScript, Android Studio, NodeJS, MySQL, PHP, Authentication, API.

Class: BSc(Hons) Computer Systems

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Student Name: Martin Bluszcz	**Supervisor:** Gary Couse
Project Title: Outdoor Augmented reality Treasure hunt application.	
Research Question: Application of location based augmented reality for Android and iOS using Unity3D	
Project Abstract: Augmented Reality (AR) has become one of the hot topics in recent years. Project's aim is to implement Augmented reality technology using Unity3D for Android and iOS platforms to create a treasure hunt game. The application will allow its users to create a treasure hunt games and share them among others. Also, the app will take advantage of camera feed and other sensors available to overlay data in users view using AR SDK's available for Unity 3D. The app will use KudanAR marker-less capabilities to show object in the camera feed. Application will also use MapBox SDK and it's geocoding facility, to translate user coordinates in both ways e.g. reverse and forward. Additionally, one of the most interesting features MapBox has to offer is their Direction API, implemented for the purpose of the Treasure Hunt App to point users in right direction Application will also use services provided by Firebase. Firebase provides a real time databases and backend as a services, which gives users fast data feeds and stores the data safely on the cloud. Firebase Auth facility allows for authorization and management system for registration.	
Technologies used: Unity3D, MapBox SDK for Unity3D, KudanAR, Firebase SDK, Samsung Galaxy S4 Active, Microsoft Visual Studio 2017, C#	
Class: BSc(Hons) Web Development	

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Student Name: Jade O'Sullivan	**Supervisor:** Gary Couse

Project Title: Using mobile devices and various web technologies to help increase motivation in weight management.

Research Question:
How can web technologies be used with mobile devices to help encourage users to maintain a healthy lifestyle?

Project Abstract:

The purpose of this project is to use web technologies and mobile devices, along with motivational techniques to encourage individuals to maintain a healthy lifestyle through a combination of diet and exercise. The first part of this project involves researching different techniques to help motivate users including:

- ❏ Daily food and exercise logs allow individuals to track and monitor their progress
- ❏ Weight Logs allow the user to view a history of their weight
- ❏ A combination of different charts and graphs allow users to visually document their progress including their weight and their BMI.
- ❏ Notification messages are sent to the user's device at a time specified by that user. These messages are used to motivate individuals by displaying an inspirational quote, a daily fact, or an encouraging message. Each message is chosen randomly from the database. This can be completed using the Notifications API.
- ❏ Food logging reminders are sent to the user's device to remind them to log their food for that day.

The second part of this project looks at the implementation of many modern web technologies including progressive web applications. Along with the Service Workers API, progressive web applications allow developers to create an application that can offer the user a native app-like experience from a mobile browser. Progressive web applications can provide the user with an added list of functionalities including the ability to log their data while offline. Since progressive web applications provide the user with a fast, reliable, and engaging experience, it will allow the user to quickly and conveniently monitor basic information such as their weight and their food intake.

Technologies used: : HTML, CSS, JavaScript, PHP, CanvasJS, Bootstrap, Service Workers, Notifications, VPS Hosting

Class: BSc(Hons) Web Development

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Student Name: Alan Smith	**Supervisor:** Dr Ignacio Castiñeiras
Project Title: corasEAM - Emergency Accommodation Management.	
Research Question: Can we create a smart system to make Emergency Accommodation centres more accessible to those in need?	
Project Abstract: Homelessness is a major issue, not just in Ireland, but worldwide. In Ireland alone over 6000 people avail of emergency accommodation on a monthly basis, often people have to be turned away due to lack of space. This project accomplishes the following goals: 1. Enable emergency accommodation services to be more accessible to those in need. 2. Enable in-depth and publicly available statistics to be available about the extent of those using emergency accommodation services. 3. Enable those providing said services to be able to better plan resource allocation through data analytics provided by the system. This project addresses the above problems by providing multiple systems which work together to let those in need of emergency accommodation check availability of centres near them, and reserve a space if space is available. It lets centres themselves track the use of the services provided in a more detailed way, and provides recommendations on resource allocation based on past data and other factors. This is achieved by leveraging some of the most cutting edge technologies across server infrastructure, web application development, mobile application development and machine learning.	
Technologies used: Angular.JS, Node.JS, Express.JS, CoffeeScript, Android, Java, Python, SciKitLearn, Golang, Echo, Socket.IO, Electron and many more.	
Class: BSc(Hons) Software Development	

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Student Name: Darren Smith	**Supervisor:** Dr Ignacio Castiñeiras
Project Title: Portable notification system for people with hearing impairments. (Alert!fy)	
Research Question: Can we develop an IT solution to alert hearing impairment people in the event of an emergency in a building?	
Project Abstract: Hearing impairments is a lot more widespread than most people realise. On average 2 children per thousand are born with a hearing loss, with 8% of Irish adults having a significant disabling hearing loss and 1 in 3 people over the age of 65 having a significant disabling hearing loss. In the event of an emergency in a building (such as excessive smoke or smell of gas), alerting the occupants quickly and keeping them informed during the course of the situation can reduce injuries and save lives. The aim of this project is to investigate, model and implement a technical solution to effectively alert people suffering from profound deafness and hearing impairments. The issue of alerting the hearing-impaired resident in the scenario of a visitor arriving at their door will also be addressed. The proposed solution focuses on notifying residents in the hotel environment. It includes an administration website, a hotel management website and a mobile application for the hotel clients. The functionality includes automatic recognition of nearby users and their automatic notification in the event of an emergency. Additional client-staff communication is supported to provide clients with different services during their stay at the hotel.	
Technologies used: Python, Java, HTML, CSS, JavaScript, MySQL, Android, Django, Bootstrap, RabbitMQ, Git.	
Class: BSc(Hons) Software Development	

27

Student Name: Alan Riordan	**Supervisor:** Dr Ignacio Castiñeiras

Project Title: Improving Timetable Accessibility and Attendance Monitoring Systems in CIT through ESL Room Timetable Displays, Mobile Technologies and NFC.

Research Question:
Can timetable administration and attendance monitoring in CIT be improved by using a novel IT solution combining ESL displays, a mobile app and NFC?

Project Abstract:

This project aims to offer a more automated way for dealing with timetable administration, timetable delivery and attendance monitoring in CIT.

The system is comprised of two primary components:

1. A network of electronic room-timetable displays, each capable of displaying dynamic content and automatically updating their displays in accordance with semester timetable activity. The service runs behind the network of electronic displays, monitoring the timetable database for changes and forwarding updates to the appropriate displays accordingly. This effectively automates the task of updating room timetables.
2. A mobile application, which serves as a portal to all information relevant to CIT students and lecturers, including information on timetable changes and student attendance. On top of the common functionality provided to both students and lecturers the app allows lecturers to view the attendance roll-sheets per class, as well as to notify lecture cancellations due to illness or other reasons. Lecture updates will be reflected in the mobile application and the appropriate electronic room-timetables. Students avail of specific functionality, allowing them to check-in to class using an NFC touch-based connection between the electronic room-timetable and the mobile phone containing the app. This NFC check-in process automates the process of attendance recording.

Technologies used:
ASP.NET MVC, Entity Framework, Microsoft SQL Server, Microsoft Azure Cloud Platform and Services, Android, Windows Services, Imagotag ESL (Electronic Shelf Label)

Class: BSc(Hons) Software Development

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Student Name: Michael O'Sullivan	**Supervisor:** Dr Ignacio Castiñeiras
Project Title: SportsHub.	
Research Question: Can an android application be created for getting in contact with people who want to play sports?	
Project Abstract: Practising a team sport is known to be healthy and good fun. Thus, the amount of sport events (and people attending to them) could be increased if the community of potential users wanting to play could be get in contact. The primary goal of this project is to create a mobile app-based social media service allowing users to organise/participate on a sporting event in a sporting category they are most interested in, such as soccer, tennis or basketball. Once the sports event is created, other users can join this event. Each user has its own profile, consisting of rating from previous events attended. After an event, the event organiser can leave a review on the players, such as their performance or if they show up. Users can send friend request to other users on the application who they may have played together with in a previous event. Once friends, they can add each other to groups, where they can create new events and/or send messages.	
Technologies used: Android, Node.JS, AWS, Firebase, MySQL, Google Cloud Messaging, REST, RxJava/Android, Retrofit, Butterknife, GIT	
Class: BSc(Hons) Software Development	

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Student Name: Jane Lee	**Supervisor:** Dr Ignacio Castiñeiras
Project Title: Automating internship recruitment through the application of matching algorithms.	
Research Question: Can internship recruitment be automated and enhanced through the application of matching algorithms?	
Project Abstract: Every year 50+ students from the Computer Science department go on work placement. A high number of companies offer a wide range of positions, looking for students with a nice combination of technical and social skills. The aim of this project is to simplify, en-hance and automate the work placement recruitment process at CIT, also maximising the satisfaction of students and companies. One of the major cost factors associated with online recruitment is time. This platform aims to reduce this cost factor for employers and candidates alike, through the application of a well-known matching algorithm (based on the classical “stable marriage problem”), which matches candidates and positions based on preferences. To perform such matching, employer and candidate preferences must be specified. Employer preferences are automated through psychometric testing (which candidates complete following registration), while candidate preferences are manually chosen from a list of applied positions. This automated matching process significantly reduces time-wasting, while maximising the satisfaction for all involved parties. The platform itself is profile-based, allowing users to display their information on their personal profiles as opposed to a traditional cv. The aim of this is to eliminate cv-style recruitment and provide a more modern and user friendly interface, in which information such as experience, education, available positions and media is displayed.	
Technologies used: Node.js, MongoDB, Handlebars.Js, Ajax, Python, jQuery, HTML5, CSS3, Bootstrap	
Class: BSc(Hons) Web Development	

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Student Name: Sinead McDonnell	**Supervisor:** Dr Ignacio Castiñeiras
Project Title: PaaS Monitoring Application.	
Research Question: Can we monitor a web application hosted by a PaaS provider to see if their Service Level Agreement (SLA) is being adhered to?	
Project Abstract: Cloud service providers allow an IT company to reduce its infrastructure budget by hosting its applications/services off-premises (on the cloud) and subscribing to SLA-based payment methods. With an increasing number of companies following this avenue, it becomes crucial to provide independent testing to ensure such these SLAs are being respected. The purpose of this project is to monitor an application that is being hosted by a PaaS provider, for example Pivotal Web Services (PWS) or Amazon Web Services (AWS). The key elements being monitored are the uptime and the load balancing of the application. A user is able to register as many applications as they require for monitoring. The monitoring is done by using a ping to the application that is being hosted. If the application is found to be down, then an email is sent to the user to notify them of such event. The application also monitors if the hosted application is being load balanced by analyzing the response that is returned from the ping. The data that is obtained from this is then displayed visually through the use of graphs on the homepage of each individual user.	
Technologies used: Nodejs, MongoDB, HTML5, Bootstrap, CSS3	
Class: BSc(Hons) Web Development	

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Student Name: Jakub Pronobis	**Supervisor:** Dr Ignacio Castiñeiras

Project Title: Dietbook - Dieting social networking website.

Research Question:
Can a dieting social networking website be used to encourage healthy eating?

Project Abstract:

Nowadays, people are becoming aware of the benefits of having a healthy diet, eating foods that provide the essential nutrients for the human body and consuming these foods in moderation. The lack of a healthy diet is a big problem in modern societies: Only in Ireland, a research by Irish Heart Foundation reported 61% of Irish adults to be obese or overweight, and thus susceptible of suffering diabetes, heart disease or high blood pressure.

However, carry out a healthy diet is not an easy task, as it requires knowledge and commitment. As humans, the possibility of sharing our experience and being exposed to the one of others helps us on carrying it a task. In this context, social networks seem to be the perfect scenario to share this healthy eating experience globally.

The aim of this project is to take advantage of social network and healthy eating trends to create a social networking website with diet management functionality. The functionality includes the possibility of adding ingredients, meals, diets and diets journeys, tracking the nutrients being taken and measuring the weight loss. The social networking component allows to access the profiles of other users, to be exposed to their ingredients, meals and diets.

Technologies used:
React.js, MySQL, Amazon Web Services (AWS), Node.js, Source Control (Bitbucket)

Class: BSc(Hons) Computer Systems

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Student Name: Stephen Higgins	**Supervisor:** Dr Ignacio Castiñeiras
Project Title: Medication tracking and notification android application.	
Research Question: Can an application be developed for the tracking of medication being taken by a user?	
Project Abstract: Medication helps people to increase their life expectancy. However, with many medications that are incompatible with one another, it is vital that people are aware of what they are taking and what not to take together. The dangers of mixing different medication are both important and difficult to remember, so having an application tracking this information for the user would be extremely beneficial and would help to prevent any accidentally consumption of incompatible medication. The goal of this project is to develop an Android application for the tracking and management of the medication to be taken by a user. The user can add what pills/medication are to be taken, as well as the intake frequency. The application keeps track of this information, triggering reminders to the user at intake time. It also cross-references medical data to determine incompatibilities between submitted medications. In the event that the user is out of medication, a map shows the location of the nearest pharmacy. The administrator of the application will be able to view various statistics relating to information entered by all users of the application.	
Technologies used: Java, Android Studio, MySQL, Google Maps API, Github, AWS, MySQL Workbench	
Class: BSc(Hons) Computer Systems	

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Student Name: Shane Murphy	**Supervisor:** Dr Alejandro Arbelaez

Project Title: Online Voting System using Biometric Data

Research Question:
Is it possible to create a safe and encrypted platform to allow online voting using a sample of Biometric Data?

Project Abstract:

The objective of this project is to create a service that would allow online voting while authenticating an individual's identity with the use of the fingerprint scanner feature on android phones.

In 2016 elections there was a 64.5% voter turnout, meaning roughly 1,170,000 voters did not have their say, which could be a result of multiple reasons, including ease of access and conflict with work schedules. With this in mind, I wish to combat the low turnout and allow an easier and hassle-free way of voting.

Voters will be required to register on a site to become a verified user. When a referendum is taking place, to vote, a user will login to the site and a 2-way authentication will take place. An email with a unique token will be sent to the user and a unique token will be generated when a user verifies their fingerprint using the android application. The user will be given a limited amount of time to enter both codes to allow them to proceed to the voting stage.
Once a vote has been casted, counted and checked if voted by a verified user, the identification of the user will be stripped to allow the vote to be anonymous and untraceable.
The website will be created using PHP, HTML, CSS and React.js and which will be hosted on a server using Amazon Web Services.

Technologies used:
MySQL, PHP, HTML,React.js,CSS, AWS, Java, Android Studio, Atom, MySql Workbench

Class: BSc(Hons) Web Development

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Student Name: Darren Sisk	**Supervisor:** Dr Alejandro Arbelaez

Project Title: Fantasy Football Draft Android Application

Research Question:
Does the addition of popular or trending features help or hinder a classic game design.

Project Abstract:

Fantasy Football is an extremely popular game that is played my millions of people around the world. The premise of it in general terms is that you are basically the manager of your team of players from a particular league. For my project, I will be changing certain features but also looking at adding in features that are popular or newly trending in other applications.

My main idea is to incorporate the element of a draft when selecting your team, rather than the traditional method of having a budget to select any players you want. So what I would do is have 11 empty slots in the team selection screen. When the user clicks on one of the slots, they will be presented with 5 different players who play in that position. This idea is based on a feature that was implemented into FIFA 16 last year on the PlayStation and Xbox.

I would also like to incorporate an element of a news feed to the app. This is something that had been introduced into popular football games such as Pro Evolution Soccer in the last couple of years. They users can keep up to date with their favourite team through the game.

I also want to display certain player analytics in graph form, to demonstrate how good a player is performing, and how much a player has grown in the last few years. This is a nice way to track how your players have been performing in real life.

Technologies used:
Java, Android Studio, PHP, SQL, PHPAdmin

Class: BSc(Hons) Software Development

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Student Name: Nealus Burke	**Supervisor:** Dr Alejandro Arbelaez
Project Title: Mobile Application Localisation Platform	
Research Question: Can the localisation of Intel Security's Google Play App Store content be handled using a web application?	
Project Abstract: Localisation (L10n) is the process of adapting a product or content to a specific locale or market. Internationalization (I18n) is a design process that ensures a product (usually a software application) can be adapted to various languages and regions without requiring engineering changes to the source code. The localisation department of Intel Security specialises in translating content so that it is adaptable to various locales. Intel Security are seeing the move to mobile create new opportunities and new challenges, one of their main problems is how they handle the translation of the text needed when submitting an application to the Google Play app store. With no automated solution to handle this content they have the following issues: current process is time consuming, error prone; no suitable system or process in place to support scale and growth of content and delivery requirements; no facility for Localized Content re-use or leveraging in place; a basic of all localisation systems is to store and reuse existing translations to save money. Current process is not mature enough to support this. The aim of this project is to create an end-to-end workflow system that will:manage the translation of both English and non-English content; provide a standardised localisation request system; provide access to a TMS (Translation Management System) to automate the translation workflow; provide ability to scale for future growth.	
Technologies used: AngularJS, CoffeeScript, C#, Sass, MySQL, Npm, GlobalSight API, HTML, Node.js	
Class: BSc(Hons) Web Development	

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Student Name: Colm O'Sullivan	**Supervisor:** Dr Alejandro Arbelaez
Project Title: Web based Point of Sale Application	
Research Question: Develop a responsive web based Point of Sale Application for a multi-store business	
Project Abstract: Point of sale systems are an integral part of the day to day operations of most shops, legally businesses who make taxable sales are required to keep six years of transaction records. The primary purpose of this project is to provide an easily accessible interface which can perform and record sales. The project is aimed at small to medium sized businesses. The system also enable a business to have multiple stores, tills for each store, employees, customers and products. The system is available from any web browser on desktop or mobile with a responsive layout. Running on a desktop will enable the user to scan product barcodes with a USB barcode scanner and print receipts with a USB thermal receipt printer. Customers can register for a loyalty program by scanning their NFC enabled phone over a NFC tag which directs them to the customer registration page and an android application enables the customer to login and view previous transactions	
Technologies used: Java, JavaScript, AngularJS, Angular Material, HTML5, CSS3, Spring Boot, Hibernate, Apache Tomcat, Maven, MySQL, AWS, Android	
Class: BSc(Hons) Software Development	

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Student Name: Cormac Finnegan	**Supervisor:** Dr Sean McSweeney
Project Title: ATLAS - An Autonomous UAV System for Automated Sensor Networks	
Research Question: Can remote sensor data data collection be accomplished through an autonomous platform?	
Project Abstract: Environmental data collection is an important factor in many industries, from scientific research to property development. However, even with the new and exciting methods used by Internet of Things technology to improve performance, getting data from the field to the computer still relies on physical human collection. This project proposes a solution that utilises UAV technology to collect data from deployed sensor nodes. Individual sensor nodes are placed in a remote location and an approximate GPS coordinate for each is recorded. The node locations are added to Node text files in a specified directory which are read by the system. Upon selecting a node for data collection the system creates a flight plan (Mission) for the UAV and sends it to the onboard computer. The UAV will then autonomously navigate to the Node's location and perform the collection of the Node data and return to the point of initial takeoff. The UAV's telemetry data including Battery Level and Location are sent continuously back to the Base Station during the flight. Upon returning to the base station the data can then be read from the onboard Raspberry Pi by the user to record node data.	
Technologies used: TinyOS, Python, Raspberry Pi, 3DR Solo, APM	
Class: BSc(Hons) Software Development	

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Student Name: Kamil Mudy	**Supervisor:** Dr Sean McSweeney
Project Title: A deployable reusable environmental sensor pod	
Research Question: Can the deployment of remote sensing pods be automated?	
Project Abstract: Planning municipalities has become a hard task for today's urban and suburban planners and administrators as there are many factors that need to be considered when performing this activity, such factors include, but are not limited to: air quality, noise pollution and temperature. The existing environmental monitoring systems are often big, immobile and expensive which may put some limits on planners and administrators when it comes to expanding or planning for new municipalities. This project aims to cut down on deployment of environmental monitoring systems as well as automate a lot of the steps involved in setting up and running of such system. The project achieves those aims by using a small budget Internet of Things solution. The project utilises Intel Edison, a small computer on module which takes care of collecting the data from different sensors. The Edison then sends collected data to a server and from the server to the database. A simple and easily readable website displays the results on informative graphs. The project is scalable, which means a potential user could add as many sensor pods equipped with Edison as desired as well as fully customise the sensors on the board to satisfy users needs.	
Technologies used: Intel Edison, Arduino IDE, Node.js, Express, Handlebars, HTML, MongoDB, D3.js	
Class: BSc(Hons) Software Development	

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Student Name: Lorna Costello	**Supervisor:** Mary Davin
Project Title: Management booking system and application for medical based practice.	
Research Question: How can the standard medical practice system be improved for productivity and ease of use?	
Project Abstract: The main goal of the project is to create an application that solves the issue of appointments in a medical practice going unfilled, due to cancellations and time constraints. With a growing demand on medical services in standard medical practices, it is harder for patients to access appointments when needed. If a patient does not show for an appointment it also means that a practice is unable to fill available time slots. The project aims to provide a service to allows patients to book and cancel online, and to also reduce the workload of the secretary in a practice so that they can then focus on patients attending the practice rather than scheduling appointments. It also aims to provide practices with a technological base, due to each generation becoming more expectant in relation to the provision of services.	
Technologies used: Spring Boot, Cassandra, Bootstrap, Gradle, Twilio, Pivotal Web Services	
Class: BSc(Hons) Software Development	

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Student Name: Eileen Hogan	**Supervisor:** Gerard Mac Sweeney
Project Title: The Use of Mobile Device Management Systems in a Workplace Environment	
Research Question: What would be the best solution for BYOD in a workplace such as Marymount University Hospital & Hospice, and what MDMS Provider would be most suited?	
Project Abstract: The number of BYOD (Bring Your Own Devices) has increased dramatically in the workplace. This provides many benefits but also brings a higher security risk. Mobile Device Management Systems make using your own device with sensitive work information possible as they deal with corporate data segregation, securing emails, securing corporate documents on device, enforcing corporate policies, integrating and managing mobile devices. They can also wipe a device of any data as soon as there is a security breach. This project investigates different Mobile Device Management Systems. It provides a comparison of the systems to help potential users to be able to make an informed decision as to which might be most suitable for a specific area/industry. I'm specifically considering which MDMS is most suited in to Marymount University Hospital and Hospice.	
Technologies used: SOTI MobiControl, ManageEngine & Microsoft Intune	
Class: BSc(Hons) in IT Management	

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Student Name: Eileen Murphy	**Supervisor:** Gerard MacSweeney
Project Title: Amazon Web Services Desktop Application	
Research Question: Can a python application for Amazon Web Services provide convenient access to Amazon Web Services to their users?	
Project Abstract: Cloud Computing is rapidly expanding and new technologies are created daily. As a result, IT is rapidly changing and technologies are quickly becoming obsolete. As cloud computing has expanded, Amazon Web Services have also evolved and expanded and is now the most used provider for cloud computing for both personal and business use. The purpose of this project is to create a menu based python application that supports these services in a convenient way for users to access these services quickly and easily using a single point of entry. Currently, this application is setup to provide users access to Amazon Web Services EC2, S3, DynamoDB and SQS services.	
Technologies used: Python, Amazon Web Services and Boto (a Python package that provides interfaces to Amazon Web Services.	
Class: BSc(Hons) in IT Management	

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Student Name: James Reynolds	**Supervisor:** Gerard MacSweeney
Project Title: VXLAN in a Data Center	
Research Question: Does VXLAN offer a viable solution for the limitations of VLAN?	
Project Abstract: VXLAN in the context of a data center is aimed at addressing the limitations imposed by VLAN. The aim of VXLAN is to alleviate the limitation of 4096 VLANs per network where VXLAN offers 17.6 million segments or 4096^2. The main aim of this project is to both research VXLAN and then implement it. Without a solution like VXLAN the cost of networking in a data center will skyrocket and become unmanageable. By using VXLAN a data center can greatly reduce the cost involved with taking on more customers.	
Technologies used: Cumulus Linux, Mellanox Technologies Switches, Ubuntu Server.	
Class: BSc(Hons) in IT Management	

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Student Name: Patrick Neville	**Supervisor:** Gerard Mac Sweeney

Project Title: Creation of an automated cloud testing platform capable of performing software automated testing aimed at small to medium size enterprises.

Research Question:
Is it possible for a SME to create a cloud platform capable of performing software automated testing on a very limited budget and do so internally without outsourcing?

Project Abstract:

The use of computer software is paramount today and is used for many different purposes by small and large organisations. It is advancing at a rapid rate and this trend is set to continue and accelerate. Most organisations both large and small use software. Software has to be designed, written and implemented. It also requires thorough testing and the most productive test process in software testing is automation.

This project focuses on using the scalable, on-demand characteristics of cloud for the purpose of running automated software tests in a manner which is cost effective for SMEs.

Technologies used:
Amazon Web Services, AWS EC2, Selenium WebDriver, Test-NG, Maven, Jenkins, GitHub

Class: BSc(Hons) in IT Management

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Student Name: Kevin Verma	**Supervisor:** Noreen Gubbins
Project Title: Security vulnerabilities when developing a social media platform	
Research Question: What security risks do social media users face and how can developers secure these risks?	
Project Abstract: The main goal of the project is to demonstrate the security vulnerabilities that can occur when developing a social media platform. A social media platform was developed where multiple users can engage safely and easily with one another. Security was kept to the forefront of the development to ensure users are kept safe and their information is protected in the best possible way. At each stage of the development iteration, security risks are determined. A live demonstration of these attacks as they would occur in a real world environment is implemented. For each risk, it is shown how such risk can be mitigated or removed.	
Technologies used: Apache Web Server, PHP7, MySQL Workbench, Metasploit	
Class: BSc(Hons) in IT Management	

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Student Name: Aidan O'Neill	**Supervisor:** Byron Treacy
Project Title:	
Research Question: Is RFID the most suitable technology to use for tracking of hardware assets	
Project Abstract: This project focuses on the area of Asset Management and Tracking of assets. I researched the state of the art to see what systems are already in place and if there are systems out there that meet Janssen Pharmaceuticals requirements. I compared these systems and documented in detail how asset tracking, especially RFID, has been utilised to good effect by other organisations. I developed a plan to implement an Asset Management and Tracking system at Janssen Pharmaceuticals.	
Technologies used:	
Class: BSc(Hons) Computer Systems	

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Student Name: Colin Ryan	**Supervisor:** Dr Donna O'Shea

Project Title:
Improving Student Retention With Bluetooth Low Energy Beacons

Research Question:

- Is it feasible to use Bluetooth Low Energy (BLE) Beacons in a third level academic institution with the aim of automating and recording student attendance?
- What is the best position in a lecture or lab to install the BLE Beacons?
- What is the min transmission power required to provide reliable and accurate coverage in different positions in a lab or classroom?

Project Abstract:
The Higher Education Authority (HEA) estimate that as many as one in six students in the higher education system fail to progress past their first year of study. The HEA reports that this problem is particularly acute in technical courses such as computer science. Colleges have responded by developing student engagement and retention initiatives that focus on collaborating with academic staff to implement a range of student-centric strategies. A pivotal enabler of such strategies is the early identification of at-risk students, which facilitates pro-active engagement with the student. A key strategy supporting the identification of at-risk students is student attendance records, monitoring student participating in every class. At present, most higher education institutions use a paper based approach to record this information and this information is not shared or correlated to support the early identification of at risk students.

The aim of this project is to create an automated student participation and class registration framework. In this framework students participation and class registration will be automatically monitored and managed using technologies such as BLE beacons and a smartphone app. A beacon is installed in each classroom and a student uses the app to record their attendance based on the beacon they are in proximity of. A web application will be provided to manage the system and view registration records.

As beacon technology is still in an experimental stage a key objective of this project is to investigate the suitability of beacons for use in a traditional university campus setting. The research methodology adopted in this project used experimental research design and methods. The purpose of the experiments and subsequent quantitative analysis was to determine the ideal beacon placement in various lab, classroom and other settings, taking into consideration environmental interference and signal propagation.

Technologies used:
Beacons(Bluetooth Low Energy), Eddystone, Android, Java, Amazon Web Services, DynamoDB, Spring Framework

Class: BSc(Hons) Software Development

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Student Name: Kyle Williamson	**Supervisor:** Dr Donna O'Shea

Project Title: Evaluation of a microservice first approach to software development.

Research Objectives:

- Develop a fully functional application and DevOp environment using microservices & containers.
- Using an application as a case study, develop an experience report of a microservice first approach to development.
- Evaluate lessons learnt and develop best practices for developing applications and applying a microservice architecture to software and services.

Project Abstract:

Over the past number of years, a new paradigm for software architecture has emerged, referred to as microservices. Microservices are singular in terms of their responsibility and can be independently scaled, tested and deployed. Services developed using this approach are built around business capabilities using best practices from domain-driven-design. Advantages of applying microservices mean that "accidental" complexity introduced as part of the traditional monolithic approach of software development can now be moved and managed through system automation and Development & Operations (DevOps). In such automated and managed environments, microservices are typically deployed and executed in containers such as Docker.

While the above represent a novel approach to software development, the reality is that the field is very new and it has been widely accepted that there are a lack of experience reports and best practices in developing applications using microservices, containers and DevOps. The purpose of this project, is to develop an application using a microservice first approach and as part of the process critically analyse the process of development and develop best practices to support this new and emerging area. The application developed using the microservice first approach was an appliance management and maintenance system. This requirements behind this application was motivated by the fact that over number of years from 1991 - 2011, the number of private rented households had increased by 10%. This increasing number of rented properties has resulted in a corresponding increase demand for property management services to ensure the smooth running of tenancy agreements. In such properties, it is dictated by law that each rental property has to have at least four kitchen appliances. The purpose of the application developed as part of the case study is to develop an appliance management solution that is capable of streamlining the maintenance of appliances managed by property management firms. The objectives of the project is the design and develop this application using a microservice first approach and the critical evaluation of the process involved using microservices as the architectural design pattern.

Technologies used:

Docker, Docker Compose, Java, Spring Boot, Spring Cloud, Spring Data, Netflix OSS, RabbitMQ, Maven, MongoDB, PostgreSQL, Android SDK, NFC, Material Design, Gradle, Python.

Class: BSc(Hons) Software Development

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Student Name: Mark O'Connell	**Supervisor:** Karl Grabe
Project Title: Authentication patterns through pressure and time gestures	
Research Question: Can android login mechanisms be made more secure using sensors; i.e. pressure/time?	
Project Abstract: In this day and age, people rely more and more on their mobile phones and other devices for a lot of reasons in their everyday lives. One of which is storing personal information, including social media accounts, contacts and PINs. It is therefore necessary to have some sort of security in the case that the person's device is stolen or accidentally lost. They are vulnerable to theft and loss due to their small size and the characteristics of their common usage environment. It is important that a more secure type of authentication is implemented. The main objective is to try to solve these security issues in mobile devices. Device security in very poor; PINs, patterns and passwords. These can easily be attempted by a different user and gain unauthorised access to a device. The idea is to authenticate users accessing android devices by using gesture recognition and authenticating them using data parameters such as pressure and time extracted from the gesture.	
Technologies used: Java, Android, Gesture libraries, Machine Learning, Bluemix, Cloud, Node.js, MongoDB, Github, Android studio, NoSQL	
Class: BSc(Hons) Software Development	

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Student Name: Pavel Vasilev	**Supervisor:** Karl Grabe
Project Title: Automated Attendance Management System	
Research Question: Investigate the suitability of beacons to be used as an identification device in limited environment.	
Project Abstract: The main purpose of this system is to provide with full automated attendance system. Most of the current attendance systems require manual handling to be managed. This is innovative idea to prove that beacons can act as identification in monitored facilities . In terms of uses this system can be accommodated in multiple industries (e.g primary school, prison, workplace, university). The system is focused on gathering unique information from the beacon and changing the real-time database, which is connected to a dashboard to showcase the whereabouts of the person.	
Technologies used: Java, Android, Javascript, CSS, HTML5, Firebase, Beacons, Polymer, CSS, HTML5, NOSQL, REST, JSON, Maven, Gradle	
Class: BSc(Hons) Software Development	

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Student Name: Liam O Gorman	**Supervisor:** Karl Grabe
Project Title: Hospital Bed Management System	
Research Question: Determine the suitability of Internet of Things (IoT) devices for real time asset state monitoring in clinical environments	
Project Abstract: The goal of this project is to try and determine whether IoT can benefit asset state monitoring in real time systems. For proof of concept, a hospital bed management system was developed. The current real time monitoring of hospital bed statuses in many hospitals is done without using technology. In some cases, a nurse admitting patients to a bed will have to ring the ward manager numerous times to confirm bed availability. In some cases a bed may not be occupied but is unavailable is it is being cleaned. A patient can be admitted to a ward but sent back because the bed was mistaken to be free. This can lead to unnecessary delays in patients waiting to get a bed. By using a Wi-Fi tagging device and a mobile application that allows cleaners to update the bed status, users will be able to track the current status of any bed at any time. This will allow users of the system to know what beds are free, speeding up the current process.	
Technologies used: Raspberry Pi 3, Android Things, Java, JavaScript, HTML, CSS, JTable, JSON, JQuery, Spring, Hibernate, REST, Logback/SLF4J, Android, Heroku, PostgreSQL, Retrofit 2, Junit, GIT, Maven, Gradle	
Class: BSc(Hons) Software Development	

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Student Name: Paul Budden	**Supervisor:** Karl Grabe
Project Title: Autonomous Aerial Inspection of Remote Structures.	
Research Question: Can the aerial inspection of remote facilities be automated?	
Project Abstract: The project is a proof of concept in regards to autonomous aerial inspections of remote structures. The system which was developed for this project, relies on interactions between hardware and software to allow for these visual inspections to be carried out. The hardware includes a 3DR solo drone, a Raspberry Pi as a companion computer, and a Raspberry Pi camera module. The software includes a "ground station" web application. This application has some features which use computer vision libraries for image processing and software used for communication with the drone. Simulation software, called "Mission Planner" was used throughout the development. The goal of the project was to eliminate the need for an operator to be on the ground during the inspection.	
Technologies used: Java, Spring, REST, WebSockets, ThymeLeaf, Javascript, JQuery, CSS, HTML, Bootstrap, Jackson/JSON, Maven, GIT, OpenCV, MobaXterm, Raspberry Pi 2, Python, DroneKit, MavLink, ArduPilot and Python Requests	
Class: BSc(Hons) Software Development	

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Student Name Franklyn Aghedo	**Supervisor:** Vincent Ryan
Project Title: Storage Redundancy with Encryption Application	
Research Question: How best to ensure the security of data stored on the cloud	
Project Abstract: The need for business continuity has become very important to many organisations. Law enforcement agencies in Ireland and wider Europe have identified a zero day malware threat on some their computer systems, although the exact source of these attacks are not known they all point to malicious attacks. This new type of malware called ransomware will take hold of users computer systems or even networks where a malicious code will encrypts the data and locks the computer systems or the entire data in the storage area network. Legitimate users of the data are then requested pay a ransom to the malicious hacker unless this amount is paid, they will delete and destroy the data. When the ransom is paid a decryption code is then sent to the user to unlock their computers or network systems. My solution is to develop a standalone backup application running on a web browser for backup data redundancy. Two or more instances of data is sent to two separate cloud storage provider concurrently. The data sent/stored is also encrypted against unauthorized access.	
Technologies used: PHP, MySQL, Apache (Xampp), HTML5, JavaScript, CSS, JSON, jQuery, Composer, Amazon S3,Gandi Cloud Storage, Openssl, LetsEncrypt/Certbot EFF	
Class: BSc(Hons) IT Management	

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Student Name: Sara Magdziak	**Supervisor:** Colin Manning

Project Title: A Customized Content Management System for CIT

Research Question:
Can a customized CMS allow an institution to improve higher education experience for students?

Project Abstract:

The aim of this project is to address the needs of students by allowing CIT to provide useful information to students in an automated manner. The students will be provided with: basic information on the Institute, the distance to the Institute on Google Maps, travel information, accommodation information, information on Institute facilities

The platform will have the following features to allow CIT to meet the expectations of students for concise and real time information:

- ❏ Recently added accommodation around CIT from Daft.ie.
- ❏ Transportation, Google Maps and weather forecasting APIs.
- ❏ Allows admin users to provide students with college facilities available in CIT and allows students to comment on these facilities.
- ❏ Allows an admin user to easily manage the platform by creating, deleting and editing any content.
- ❏ Allows admin to assign roles and permissions to users in order to allow them to manage certain content on the platform.

Technologies used:
Drupal, HTML, CSS, JavaScript, PHP, XAMPP, JQuery, API, Scraping, YQL

Class: BSc (Hons) Web Development

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Student Name: Sean Collins	**Supervisor:** Colin Manning
Project Title: NFC Writer Pal	
Research Question: Can NFC tags be used to automate a number of day-to-day processes including interacting with a Home Management System.	
Project Abstract: The app developed in this project will allow the user to select various functions and then write these functions to an NFC tag. Some possible use cases for this app include (but are not limited to): ❏ An NFC tag could be configured to automatically populate a text. For example, an NFC tag could be placed on a lanyard and given to an elderly person and in case of emergencies they could tap their phone off the tag and simply tap send to send a text to their emergency contact. ❏ A tag could be placed by your front door or placed in a keyring that when interacted with will run a specified script on a Home Management System. ❏ A location could be written to a tag which could be used for advertising a specific event location or establishment. ❏ A preconfigured email could be placed on a tag so as that someone who may need to send a specific email regularly could have it ready to go at a moment's notice.	
Technologies used: Java, Python, PHP, Android SDK, NFC, Android NDEF Tools API, Raspberry Pi, Raspbian, Apache.	
Class: BSc (Hons) Software Development	

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Student Name: Cian Redmond	**Supervisor:** Colin Manning
Project Title: Music Learning	
Research Question: How technology can be used to improve musicians' practice skills?	
Project Abstract: Music affects people on a daily basis. It is heard on TV, on the radio etc. All musicians started out with little knowledge of music and practiced to perfect their skills as musicians. Today it is a lot easier to pick up a musical instrument due to the advancements in technology. There are free online courses and YouTube tutorial videos for nearly every instrument. All these services are online and make it easier for people to learn new instruments as they are available 24/7 which makes it convenient and flexible for the user as they can learn whenever suits them. E-learning also reduces time and cost as it get rids of the need for travel as the user can learn from home. It saves the users money and it is often cheaper than the traditional private tuition. However the problem with people learning music is that they don't know how to practice. When they go on to online to learning sites they are mainly following tutorials and videos. But they are not getting constructive criticism or positive feedback on what they are doing and as a result can't progress as musicians. Another key to practicing is listening to performance. Musicians must record themselves playing so that they can hear for themselves what mistakes are being made. Progress can't be made without hearing what is wrong.	
Technologies used: PHP, JavaScript, Html, Bootstrap, Ajax	
Class: BSc (Hons) Web Development	

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Student Name: Peter Dineen	**Supervisor:** Colin Manning
Project Title: Procedural Generation of Levels with a Difficulty Parameter for 2D Platforming Games	
Research Question: Can game content be generated automatically?	
Project Abstract: With origins in roguelike games of the late 1970s and early 1980s, procedural content generation (PCG) is the algorithmic generation of game content. PCG allows for the creation of a massive amount of unique game content with minimal investment from developers as complexity can be generated rather than manually designed. PCG is used for the generation of gameplay elements such as non-player characters (NPCs), usable items, levels, world design, entity behaviour, and even the game's plot. As well as this, it can be used to generate assets like textures, meshes, music, and sounds. The purpose of this project was to develop an algorithm for the procedural generation of game levels for a platformer game. The algorithm will also generate subsequent levels according to a difficulty metric obtained from assessing the player's performance on a previously completed level.	
Technologies used: PERL, Phaser	
Class: BSc (Hons) Software Development	

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Student Name: Colin O' Regan	**Supervisor:** Deirdre Dunlea

Project Title: Nimbus Centre – Implementation of Industry Standards for Development

Research Question:
Can industry development tools, standards and methodologies be applied to research development projects?

Project Abstract:

In research centres there exist projects, especially of long durations where more than one researcher works together. Research projects differentiate to industry ones in the sense there is an element of unknown and as such multiple alternatives (possibly resulting to code branches) need to be considered and tested. Furthermore, researchers may be unfamiliar with the best practices for software development followed by industrial organisations and either need to be trained or the appropriate solutions that will fit with their ethos needs to be adopted.

The research part of this project is to investigate the particularities of research software projects and specify an environment that will facilitate:

Collaborative software development
Project management following or abiding by Agile/Scrum principles or any other software development processes
Quantifying and monitoring the progress of tasks

The development part will be delivered using existing running projects in the Nimbus Centre as case studies and will involve:

Investigation/setting up of issue tracking tools
Investigation/setting up of project management tools
Implementation of standard code repository for all code storage
Setting up of an automated testing/build system like Hudson/Jenkins on project code

The deliverables of this project would be a methodology for managing the software development in research projects with hands-on applications and tools to support that methodology in running case-studies.

Technologies used:
Agile/Scrum, GitLab, Trello, TacoAp

Class: BSc(Hons) IT Management

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Student Name: Sean Ahearne	**Supervisor:** Jonathan Sherwin
Project Title: Demonstration of software defined control of white box Ethernet switches with Tunable Wavelengths	
Research Question: Can we have control the wavelengths at which a tuneable optical switch operates using SDN methods?	
Project Abstract: In the computing industry, there is currently a huge change in networking happening. Many major ISP's and cloud computing corporations are currently implementing Software Defined Networking (SDN) methods across their networks. SDN offers numerous advantages, such as increased productivity and reduced maintenance. While SDN is making good progress on electrical Ethernet switches, progress has been slower on optical switches. This is due to there being more variables that have to be dealt with when dealing with a more complicated optical interface than a simpler electrical one. One of these variables is changing the 'channel' (the wavelength) that the optical laser is operating on. The purpose of this project is to attempt to be able to control the channel on which the optical laser in a switches optical interface is transmitting and receiving on. The advantages of doing this are it allows an SDN controller to change the channel of multiple optical switches at once and autonomously, which can be very useful for bandwidth management, network monitoring, and Quality of Service. My project is contributing to the area of network engineering. At the moment, it is possible to do what this project outlines on a proprietary switch, but there is no documented method on how to do it on an open "white box" switch. That is, a switch that allows the installation of any Operating System on it, allowing the user to choose an OS of their own. My intention is to find a way to do this for these switches.	
Technologies used: C, NETCONF/YANG, Software-Defined Networking	
Class: BSc(Hons) Computer Systems	

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Student Name: Peter Kehoe	**Supervisor:** Jonathan Sherwin
Project Title: Intermediate Device, Profile-Dependant, Path Allocation using Software Defined Networking	
Research Question: Can Switch profiles help an SDN controller forward traffic through a network, comprised of devices with varying levels of SDN support?	
Project Abstract: The objective of this project is to develop a module for an openflow controller which will improve the performance of the network by allocating appropriate paths through the network and help integrate networking equipment from multiple vendors, or with differing degrees of support for the SDN protocol, openflow. By taking into account same device characteristics such as a device's supported openflow version, memory capabilities and current traffic load, these profiles can help the controller make better decisions when installing forwarding rules. This is an important consideration as while large businesses and organisations will use devices from the same vendor, all of the same model, with the same software and hardware capabilities, the same cannot be said for all networks. Many networks will grow and evolve in stages, devices bought and integrated into the network as needed, so a dedicated decision making module that will factor in these devices, is a potential advantage for an expanding network and for current networks migrating to a software defined network. A side goal of this project is to immerse myself in the area of SDN, as an emerging technology it was not a topic that gets covered in great details during the four years of our undergraduate.	
Technologies used:	
Class: BSc(Hons) Computer Systems	

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Student Name: Adam Lloyd	**Supervisor:** Mary Davin
Project Title: Metis – Program Management System.	

Research Question:
To create a program management system to improve Intel Security's localisation workflow and provide a robust API to integrate into their existing technology infrastructure.

Project Abstract:

The localisation department of Intel Security (McAfee) is responsible for localising all of the content that Intel Security owns. This not only includes software but sales, marketing and support documents. To ensure that all of this content is correctly localized into all of the target languages, the expertise and resources of translation vendors are leveraged. This presents a problem such that, for large projects, thousands of words must be translated into many languages all with varying rates often involving multiple vendors to meet the language requirements of the project. With existing systems, the management of these projects is done manually resulting in time loss and increased risk of error.

To facilitate this process, an application was required to provide stakeholders with an interface to manage all project and financial details in one location. It must be customer facing to allow the translators themselves to submit the logs of their work once completed and integrate with existing localisation tools.

The resulting program management solution features a modern and highly usable interface with which all the stakeholders can access project information. This includes financial data, project planning details, project progress, details of project activities, stakeholder details and serves as a central repository for all of this information. All stakeholders now reference the same information resulting in workflow improvements and a reduced error rate. This information can also be accessed and integrated with existing Intel systems via a robust API. The solution has been developed from the ground up to allow for maximum potential for expanding its functionality while following the requirements spec laid out by Intel Security at the inception of the project. This was achieved by following agile development principles and adhering to a strict sprint schedule.

Technologies used:
AngularJS,CoffeeScript, C#,.Net Web API Entity Framework,SQL Server,IIS, Sass,Bootstrap,Grunt,Git,Jenkins,Jira (Project Management)

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Student Name: Louise Jennings	**Supervisor:** Dr. Ruairi O'Reilly

Project Title: A wellness platform promoting social interaction, encouraging achievement and monitoring progression.

Research Question:
Can the combination of gamification techniques and modern technology simplify the provisioning of opportunities for desirable social interaction amongst employees, assist in the achievement of business objectives and instil an increased sense of self-worth in employees.

Project Abstract:

A wellness program is designed to promote healthy initiatives, increase productivity, and encourage progression using motivation and recognition-based rewards. Wellness Works is a platform that enables social engagement, promotes interactivity, and provides feedback to users to help motivate them as they progress through their program. Gamification elements are employed to focus on behavioural changes, triggers a sense of play, and help keep users motivated.

Wellness Works enables employers to tailor wellness programs that encourage desirable behavioural/lifestyle traits in their employees. These can range from healthy living, to being more socially active or maintaining a balanced lifestyle. This is achieved through the use of incentivised events that align with the desired traits.

The creation of arbitrary events and monitoring of participation can be time consuming, the sponsoring of events can be costly and ensuring they are not abused can be challenging. Wellness Works enables employers to automate this process, monitor their return on investment and ensure they are not being taken advantage of.

Wellness Works utilises NFC allowing registration of events provided by employers. This enables the promotion and monitoring of social interactions. Creation, registration, attendance, and the subsequent analysis that follows these events is a widespread problem afflicting multi-domains. As such there is an inherent value in abstracting from the Wellness Works problem domain and making it available in a generic manner such that it is utilisable by third party services. Wellness Works developed a mechanism to speed up and simplify attendance monitoring using NFC capabilities. This tool can be abstracted and used as a generic tool for third party applications such as Meetup.

Technologies used:
Node.js, Handlebars.js, JavaScript, MongoDB, AJAX, NFC, Meetup API

Class: BSc(Hons) Web Development