Project Posters

S1 2015

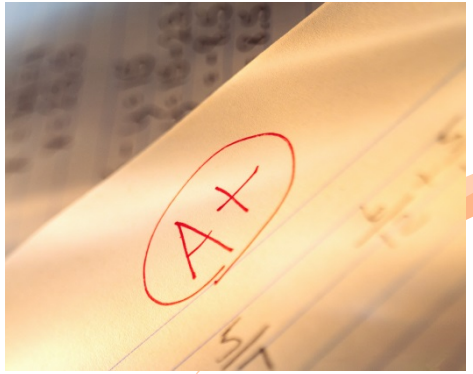
AUT UNIVERSITY COMPUTER + MATHEMATICAL SCIENCES

Today's Mission

"Your mission should you choose to accept it…"

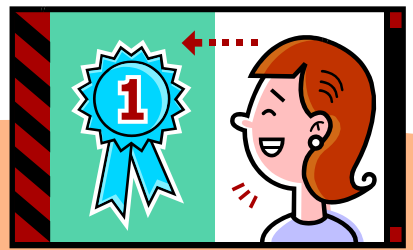
You are an examiner

- You have a number of posters to mark according to defined criteria.
- You need to share feedback about aspects of the poster.
- You should assign a grade.
- You should nominate one poster for the 'Best Poster' award. $



Details

- Critically mark each poster add your feedback to the mark sheet
- Be careful to apply the grade criteria on the mark sheet to formulate the grade
- Work in small groups (~4 students) and confer with each other to reach an agreement on the feedback and grade you assign.
- Keep note of the poster that you think should win best poster and make a note of why.



Instructions given for posters?

- Produce a poster on A1 paper that meets the goals identified in the marking criteria.
- Be prepared as a team to have any artefacts produced during your project (including a demonstration of software if applicable) available for scrutiny and to answer any questions raised by the assessment panel.
- Be prepared to answer questions on your individual contribution to the project, demonstrating critical thinking and reflections on lessons learned

Marking Criteria

Project Name: .....

Criteria	Grade
Content 50% • Outlined project objectives and rationale • Project artefacts (e.g. architecture, models, design, software, client deliverables) • How artefacts were produced • Areas of greatest challenge • Areas of greatest technical difficulty	
Presentation of poster 20% • Clarity of poster presentation • Effective technology/artefact • Spelling and grammar • Audience appeal	
Team/Individual Explanation 30% • Reflection on lessons learned • Demonstrated critical thinking • Fluent handling of questions	**NA**

Overall Grade

A+	A	A-	B+	B	B-	C+	C	C-	D	D
									> 40%	< 40%

Security Architect Wizard Tool Project

Project Overview

Aim :

Develop a wizard that will automate the current process for both IS Security & Risk team and Solution Architects to:

1. Assess the security risks associated with technical solutions.
2. Design IS solutions and select appropriate security controls in accordance with Fonterra's security standards.

Background :

Fonterra has got a number of security collaterals that Solution Architects/Designers can refer to when designing or implementing IS solutions. IS Security & Risk team have setup a questionnaire for Solution architects that helps them identify the risk levels, apply security standards and classify systems into Security Domains. As no tool currently exists that combines these various inputs to assist architects/designers in designing solutions with the appropriate level of security, Fonterra decided to automate the process.

Old Process :

There were three stages for the manual process

1) Information Security & Risk Assessment

This is used to capture the Information Assets for the project and complete the Security Impact Assessment.

Process : The solution architects/designers go through a Matrix of Risk assessment (Fig. 1) and choose risk levels associated with each dimension. Once they have completed their assessment, they are presented with the Information Security Classification ranking. This ranking gives them the level of risk to the project.

Figure 1: Risk Assessment Matrix

2) Security Standards Questionnaire

This questionnaire is used to identify all the security standards that apply to the project being designed.

Process: The solution Architects/designers answer the questionnaire and email it back to the IS Security & Risk Team. This team then goes through the questionnaire and maps the answers to appropriate Fonterra Standards. Based on the answers a list of security standards are then emailed back to the architects/designers.

3) Security Domains Questionnaire

Each project can have one or more than one systems associated with it. In this stage each system on the project is categorized into a Security Domain based on its functionality.

Process: The solution Architects fill out separate questionnaires for each system and send the questionnaires back to IS Security & Risk team. IS Security & Risk team categorize each system into a Security Domain then revert back to Solution Architects with all systems defined into appropriate Security Domains.

Figure 2: Classification of Security Domains

Need for the wizard:

- Automate the complete process.
- Minimize workload for IS Security & Risk team.
- User friendly process & ease of use for Solution Architects/Designers.
- Reduce Multiple handoffs between IS Security & Risk team and Solution Architects/Designers.
- Enables users to complete the questionnaire partially and continue later.

Proposed Solution:

- Develop a stand alone application that incorporates all three stages of old process into one.
- Use Metalogix(Fig. 3) to associate each answer on the wizard with a security control at the backend for all three stages.
- Admin mode to modify questions.

Figure 3: Use of metalogix in one of the questionnaires

Project Management

Role on Project :

1) Requirements documentation : The developers started 2 months after I was assigned to this project as Business Analyst. So I had to make sure all the documentation relating to requirements and the logic behind the wizard is completed before the developers started developing the tool.

2) Co-ordination with client & developers : In addition to the role of Business Analyst I was also acting as proxy client for developers. This was agreed upon to minimize meetings with the client and to be readily available to developers when needed. As I was at same level as that of client as far as logic was concerned, this helped the developers a lot by having their queries answered within the team itself.

3) Help with developer's documentation : I also assisted the developers with creating 'User Stories' and 'Product backlog' as a part of their deliverables.

4) Presentations : Presentations to client's superiors at Fonterra and all the meetings with the client were facilitated by me.

Deliverables:

- Business Requirements Document - Intended for Fonterra
- Solution Design Documents - Intended for Developers
- Re-vised Business Requirements Document - Intended for Fonterra

Challenges/Issues :

Project Change- My project changed in 1st month through the semester so I had to start afresh by producing new Project proposals & getting them approved by AUT.

New Role- Having a Networks & Security as my major, Business Analyst role to which I was assigned was a totally new and challenging experience. Even though it did involve very low level Security Analysis but it was still new for me.

Team Change- Because of the project change, I had to leave old team members and work on my own until the developers joined up in August. The client and my supervisor did act as proxy team members but it was a challenge for me to work on my own.

Reflection - What I learned :

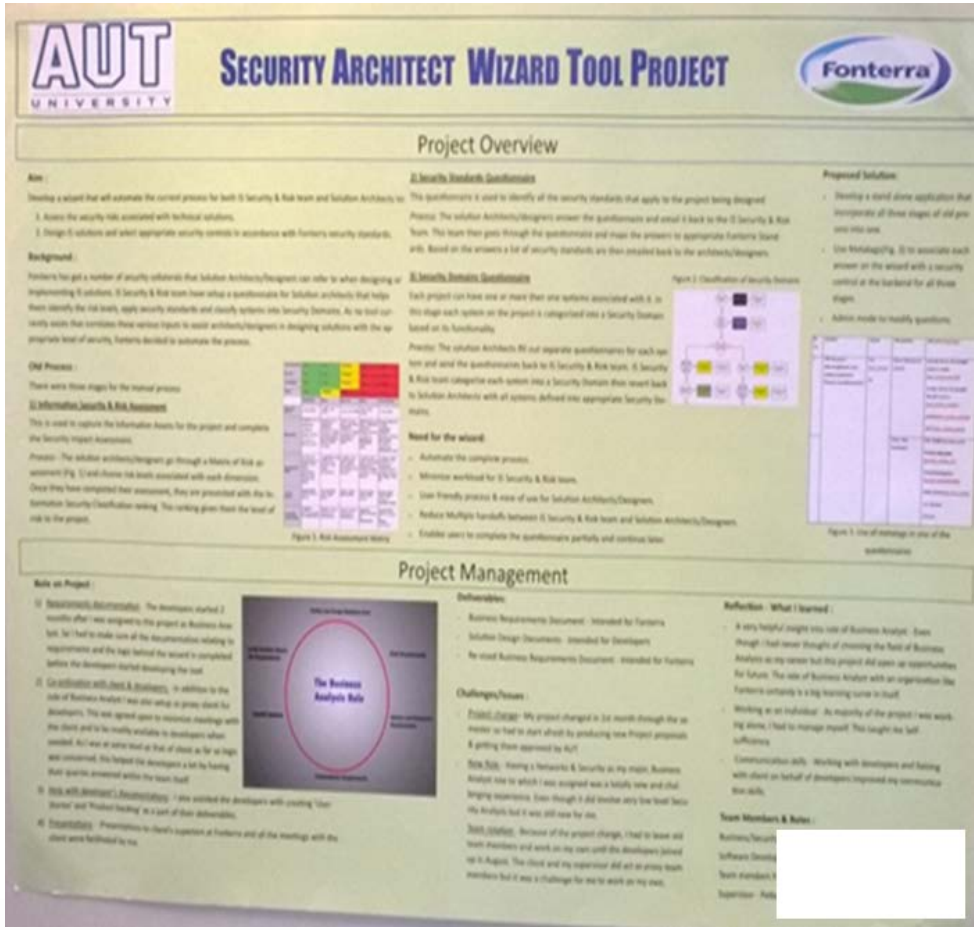
- A very helpful insight into role of Business Analyst. Even though I had never thoughts of choosing the field of Business Analysis as my career but this project did open up opportunities for future. The role of Business Analyst with an organization like Fonterra certainly is a big learning curve in itself.
- Working as an individual : As majority of the project I was working alone, I had to manage myself. This taught me Self sufficiency.
- Communication skills : Working with developers and liaising with client on behalf of developers improved my communication skills.

Team Members & Roles :

Example Posters

- Good rationale and goals identified
- Generally good depth of content though some gaps (solution rationale).
- Covers personal learning story.

- Diagrams to small to be useful.
- Flow not obvious.
- Poor choice of headings.



The Garden

Abstract

The Garden project was originally developed in semester 1, 2012 by a group of BCIS student at AUT, they delivered a working website, but some issues remained in the system. Our clients at Academic Quality office of AUT wanted to refine the product and add new functionalities to this web application.
We started this project by investigating the old system and researching methods for refactoring the system. After we made the application robust, it was in a good shape for adding new features, we applied SCRUM (An iterative and incremental agile software development method for managing software projects and product or application development.) (Henrik Kniberg 2007) for controlling our development sections and it helped us implemented new features to the garden.
Now the garden has been fully refactored and tested, we have developed an implementation plan so that our clients can migrate the site over a more front and touch the garden.

Research

Before we started our project, clients had not decided what the objective of this semester's development was. They wanted to develop the old system into an Apple iOS App.

In order to demonstrate to our clients whether or not iOS App is a good idea, we researched related information and then delivered a feasibility report, which listed the advantages and disadvantages of developing an iOS App, and based on those pros and cons, we proposed two solutions:

1. Develop an iOS app from scratch for the garden
2. Make the web application robust, and then wrap it into an Apple iOS App

After our clients understood the context of iOS App, they chose the second option as the task for this project.

According to the clients' choice, we needed to evaluate the old system (all the previous team) first, then we can wrap the site into an App, but there was no existing architecture document, so we:

- Researched web architectures to find out an appropriate design, then generated a system architecture report based on the existing code
- Run the existing acceptance test for identifying issues in the old system

Refactor

When we fully understood how the old system worked, our refactoring phase started, we first identified the smells of the existing code:

- Duplicated Code
- Long Method
- Lack of Cohesion
- Lack of Comments

The major tasks were:

1. Refinement:
   - Coding Formatting
   - Naming Conventions
   - Coding Comments
   - Content Loading System
   - Administrator Login Screen
   - System Layer Design
   - HTML Upgrade (to HTML5)
   - Acceptance Test Refinement
   - Content Editing System (Code Duplication Fix)
2. Issues fix:
   - Cross-browser compatibility
   - Glowing plaque does not go away
   - About screen goes below iPad screen estate
   - Zooming in animation is not consistent
   - Home button fade to main screen jerky not smooth
   - Plaque view template window should resize to content
   - The plaque should be fully displayed in the screen so user doesn't need to scroll the screen
   - Loading the garden outside of AUT's network is extremely slow

New Features

After the garden was refactored, it was in a good shape for adding new features, we developed:

1. Content editing functionalities for three site information drop-down windows (About, User Tips and Contact Us on the main garden screen)
2. LDAP (Lightweight Directory Access Protocol) authentication check for the administrator login
3. Auto-resized garden views for iPad rotation

The methodologies and approaches we used for developing those features were:

- SCRUM
- Poker Planning
- Pair Programming
- Acceptance Testing
- Unit Testing

Quality Assurance

The quality assurance in our project involved two aspects:

1. Acceptance Testing

When we finished our refactoring phase, the acceptance test was run to ensure that the new system satisfied all user stories were there in the old product backlog. Then our clients had the acceptance run by themselves (client run), they checked them throughout and pointed out some user stories tests need to be improved. Based on the result of the first client run, we modified the acceptance test, at the end of the final sprint, clients had the second run, and all tests have been passed.

2. Unit Testing

Because during our development phase, we changed some mechanisms in the old system, from the technical perspective, we performed unit test for JavaScript we used, the tool we used for this test is called JsUnit, the key functions that in the system have been tested and all tests have been passed.

References

1. Henrik Kniberg. (2007). Scrum and XP from the Trenches. Lightning Source Inc.
2. Agile-code.com. (2010). List of Visual Studio Code Refactoring Tools. Retrieved from http://www.agile-code.com/blog/list-of-visual-studio-code-refactoring-tools/
3. Mountain Goat Software. (2010). Agile Software Development Basics. Retrieved from http://www.mountaingoatsoftware.com/agile/scrum

Challenges

Understand the Old System and Refactor

Variety of Languages

This project used HTML, CSS, JavaScript and PHP, we needed to understand them all and make them work with each other.

Communication with Associated People

Apart from our clients and supervisors, we also needed to communicate with ICT service of AUT about the server configuration and equipment borrowing from Gardens company.

Learning

Real-world Project Experience

By completing this project, we all experienced what a real-world project felt like. It gave us a better understanding of the IT industry.

Problem Solving

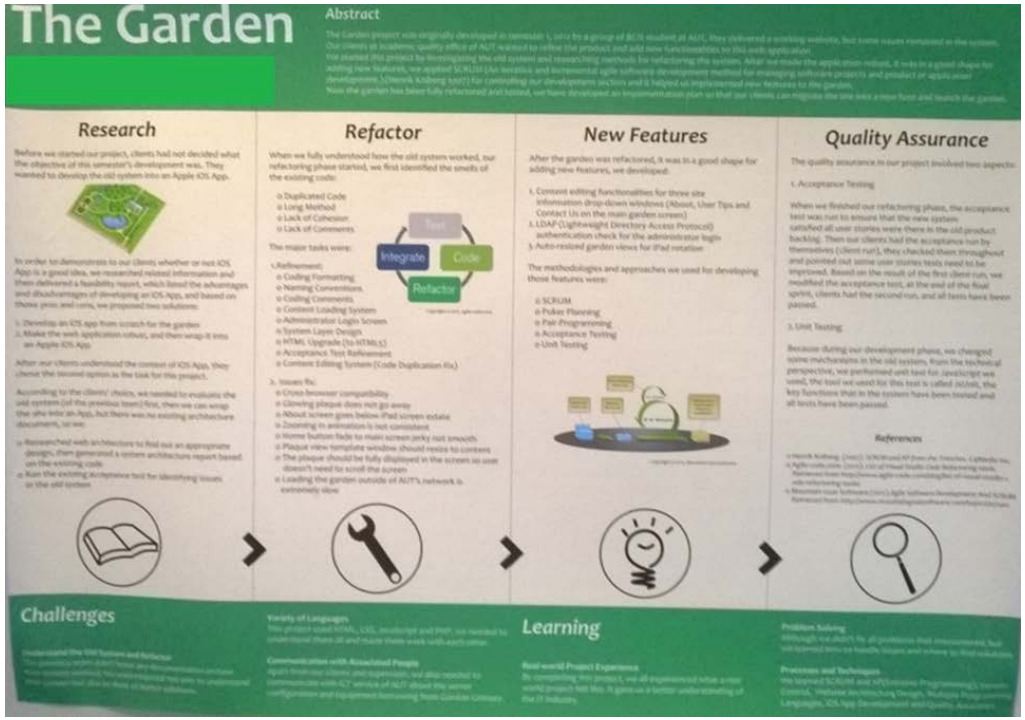
Processes and Techniques

We learned SCRUM and XP(Extreme Programming), Version Control, Software Architecture Design, Software Programming Languages, iOS App Development and Quality Assurance.

Example Posters

- Very clear flow
- Nice graphics
- Has references!
- Good depth of content and covers required topics.

- Some grammar issues.
- Some challenge in reading the font when text is white.



A MODEL FOR PREDICTING THE INCIDENCE OF CVD

AUT

BACKGROUND

Compass health a primary healthcare organisation based in Wellington, which provided the large dataset (546,978 records) Which deals with clinical data, the project was to analyse and to improve the dataset then use the improved dataset to build a model for predicting CVD (Cardiovascular disease).

Basically the dataset has significant invalid values, the client required to analyse and find the criteria for each attribute of the dataset, provided documentation about the suggested criteria.

Our objectives:

1. To analyse dataset for each attribute.
2. Write a description of the dataset for future research
3. To provide a report about process.
4. To reduce dataset in order to analyse only completed and valid data.
5. To provide pre-processing for predicting HasIschaemicHeartDisease.
6. Output evaluation.

Process:

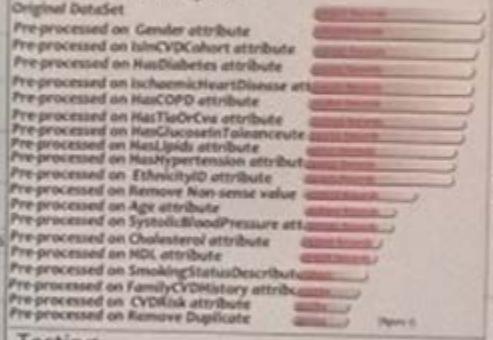
1. Methodology
2. Tools used
3. Data cleaning
4. Modelling

ATTRIBUTES

Attributes	Cleaning error values
Data ID	Record ID dataset
SceNHI	Patient unique identification
Gender	male='M', female='F', unknown='U'
Age	Non-value records under age 20
IsInCVDCohort	Both Label 1 and 0 on same patients
SystolicBlood Pressure	Some values less than 20, some exceed 1000
HDL	Significant 0 values, some more than 4
FamilyCVDHistory Description	Valid and invalid values on same patients
HasDiabetes	Both Label 1 and 0 on same patients
HasCOPD	Both Label 1 and 0 on same patients
Ethnicityid	Have multiple ID on Same Patients
HasTiaOrCva	Both Label 1 and 0 on same patients
HasHypertension	Both Label 1 and 0 on same patients
Cholesterol	Significant 0 values, some more than 10
CVDRisk	Significant records has 0 value
SmokingStatus Description	Valid and invalid values on same patients
HasGlucose Intolerance and HasIschaemicHeart Disease	Both Label 1 and 0 on same patients
QuarterStartDate	Using for confirm the record time

DATA CLEANING

We processed each attribute from top to bottom as shown in our figure.



Testing

1. We tested the codes after the pre-processing accomplished.
2. We fixed problems according to the results of testing.
3. Also the problems and solutions were recorded into the portfolio.
4. We tested codes of multiple times to prevent errors.

RESULT

Modelling "Weka"

1. The client suggested to use the software application 'Weka'.
2. We imported our reduced dataset to weka.
3. We applied the J48 algorithm to find model for predicting.
4. We processed all records with this model and evaluated the accuracy of the prediction

=== Confusion Matrix ===

a	b	<-- classified as
478	212	a = 0
156	540	b = 1

Correctly predicting of 0: 478/(478+212) = 70%

Correctly predicting of 1: 540/(540+156) = 78%

	Meaning	Number of correctly of predicting	Number of incorrectly of predicting	Successful rate
a	Patient does not has ischaemic heart disease	478	212	70%
b	Patient has ischaemic heart disease	540	156	78%

Challenges

Find right application for pre – processing
Weka → Python → MS SQL server

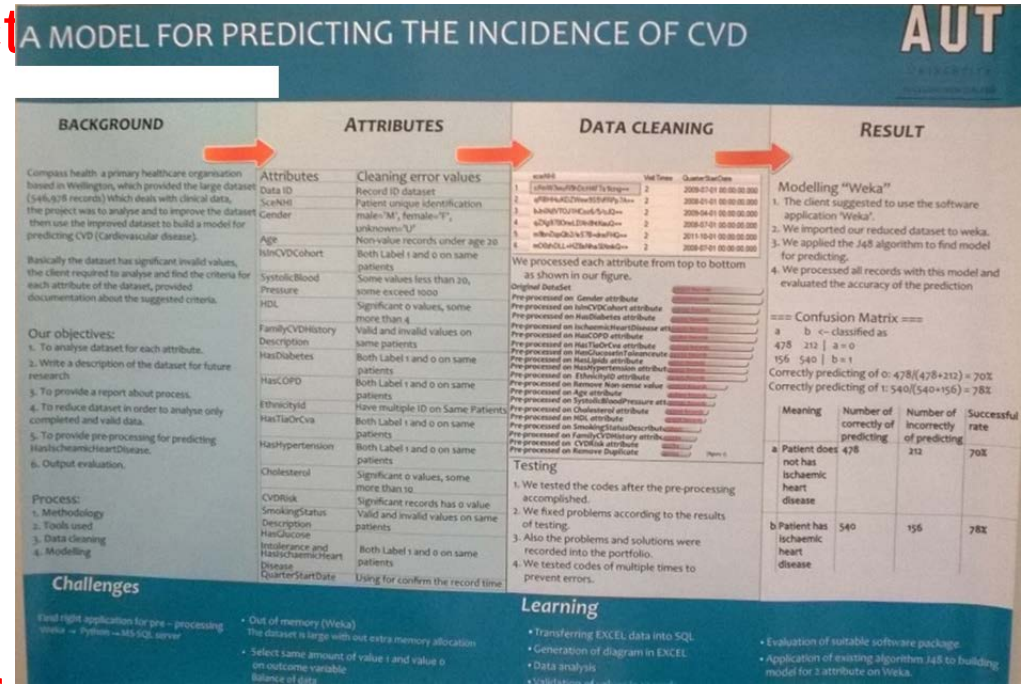
- Out of memory (Weka)
  The dataset is large with out extra memory allocation
- Select same amount of value 1 and value 0 on outcome variable
  Balance of data

Learning

- Transferring EXCEL data into SQL
- Generation of diagram in EXCEL
- Data analysis
- Evaluation of suitable software package
- Application of existing algorithm J48 to building model for 2 attribute on Weka.

Example Posters

- Very clear flow
- Poor content overall. Project rationale and goals not clear. Acronyms!
- Not effective, poor use of space.
- Some meaningless content that tells reader nothing eg ‘Cleaning error values’
- Doesn’t cover challenges or learning well.
- Some grammar issues.




AUT
YMCA
Camp
Adair
Project
Background
YMCA
Who is the client?
What do they require?
Our solution
Discovery
Research
Microsoft
Dynamic CRM
Support
Expense
Proprietary
civiCRM
Complex
Open source
Drupal
Extensible
Light weight
Open Source
Community Support
Process
Methodology
Roles in Scrum:
Product owner
Scrum master
Team
Scrum Artifacts:
Product backlog
Sprint backlog
Burn-down chart
Scrum ceremonies:
Sprint planning
Daily scrum
Sprint reviews
Sprint retrospectives
Challenges
Client and product owner availability
Incorrect time estimations
lack of experience
New feature requests
PANTHEON
Technical approach
Tools and services
Drupal CMS
Revision Control (GIT)
Pantheon Platform
Virtual Box
Technical Challenges
Lack of Experience
Undocumented 3rd party Modules
Lack of support for third party modules
Decentralized Development
Database revision Control
Product

Example Posters

- Good clear flow
- Serious lack of depth and content. Goals and solution far to brief.
- Far too many bullet point lists some of which add nothing meaningful (eg.list of SCRUm roles and artifacts.)
- Does not reference diagrams from other sources.

AUT Landspeed Research Group

Project Overview:

The AUT Landspeed Research Group is an internal AUT project working together with an organisation known as Jetblack. Jetblack is New Zealand's attempt at breaking the world landspeed record. The AUT Landspeed Research Group is a team of students who are tasked with adding value to the current Jetblack Simulator which is located within the HCI laboratory.

Jetblack Simulator → Unity Game Engine → Force Feedback
Unity Game Engine → Arduino Interface
Unity Game Engine → Android Application

JETBLACK

AUT
UNIVERSITY
AUCKLAND, NEW ZEALAND

Objectives:

The goal of this project was to extend the current functionality of the simulator by adding the following features:

Force Feedback – Giving the driver a real life representation of the simulators forces through the use of the simulators Logitech G27 steering wheel (Logitech, 2013). This is done through a Unity plugin.

Arduino Interface – Display real-time updates to the drivers of the car's status by using an LCD module connected to an Arduino board. This is done by sending serial commands over USB.

Android Application – Push information of the vehicle wirelessly to an Android device which displays that information on a graphical user interface (GUI).

Processes:

Waterfall Model (Force Feedback)
- Sequential, linear model

Agile, Scrum (Android Application)
- Iterative and incremental builds with constant client communication and input
- Sprints
- Backlog
- Retrospectives

Skills and Knowledge Gained:

- C++
- C# (Mono)
- Android Development
- Arduino – Micro-controllers
- Unity Engine
- Networking
- Proper client interaction
- Project management

Conclusion

Two of the three products have been successfully integrated into the current Jetblack simulator. The force feedback feature is still presenting problems upon running the simulation multiple times without closing the engine.

The products have been tested thoroughly both on their functionality as well as their usability. Room for improvement is always a factor as the technologies involved with the simulator and my peripherals are bound to evolve and change with time and as the Jetblack vehicle specifications are finalised.

Until this time arrives, the Jetblack simulator will use my work and will potentially offer a greater feeling of realism as a result.

Screenshot of the Jetblack simulator software running on the Unity Game Engine

unity

Photo of the Jetblack Android application on two independent devices displaying the vehicle's status updates

Photo of the Arduino LCD shield displaying the vehicle's speed on the simulator

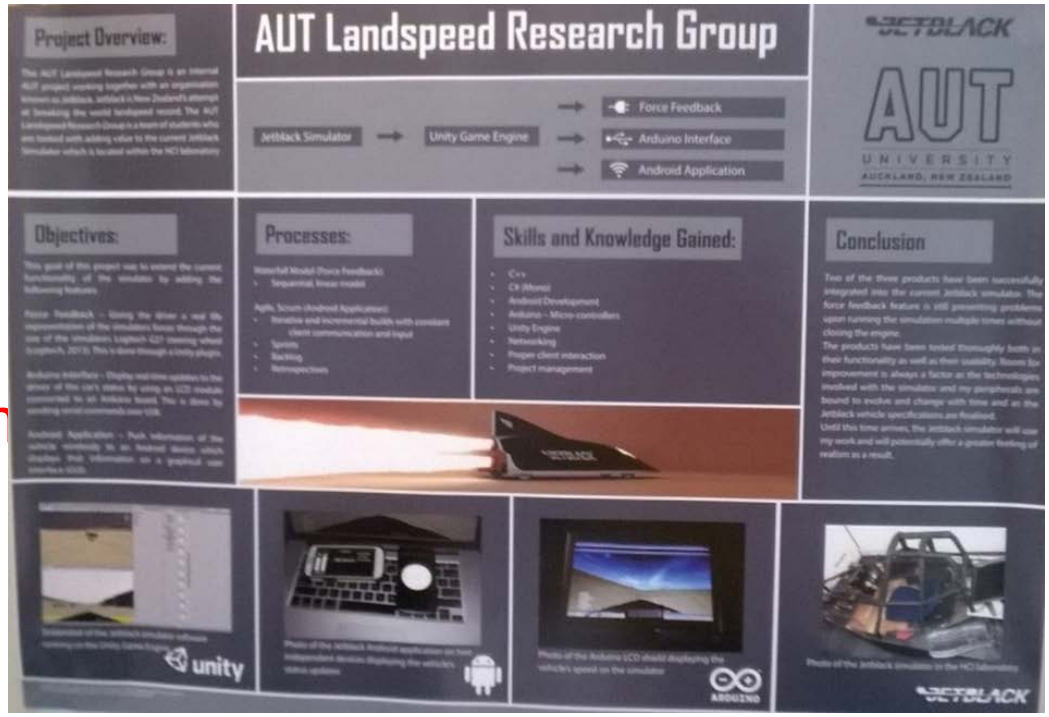
ARDUINO

Photo of the Jetblack simulator in the HCI laboratory

JETBLACK

Example Posters

- Good use of images. Well located near to text.
- Goals unclear because of lack of background.
- Lack of content and depth
- Flow not clear.
- Some material uses more space than necessary.
- No real content on challenges or learning.



Chelsea Regional Park

HOME | NEWSLETTER | OBSERVED AVIFAUNA | VOLUNTEER JOBS | HISTORY | SUPPORT US | CONTACT US

1. Introduction

Background

The Chelsea Regional Park Association (Inc.) is an organization with the key objective of establishing a comprehensive protected environmental and publicly owned area stretching from the Chelsea Estate through to Kauri Point. The organization has no existing website and requires a new advanced website to raise its profile to protect and enhance the environmental and recreation assets of the area.

Objectives

1. Analyzing client requirements
2. Developing the website
3. Hosting the website
4. Provide administration training

2. Process

Scrum methodology

- Sprint planning
- Product backlog with User Stories
- Sprint backlog
- Daily Scrum meeting
- Sprint review meeting

3. Product & Features

Content Management System

- Articles & WYSIWYG
- Gallery
- Group Email
- Newsletters
- Advertisements
- Spam Control by reCAPTCHA
- Clean URL & Pathauto
- Event/Volunteer Job publish and registration

Hosting and Training

- Live hosting
- Administration Guide
- Training Recording
- Physical training

4. Learning Process

Technical Difficulties

- Unfamiliar PHP coding
- Unfamiliar CSS coding
- Photoshop knowledge

Professional Issues

- Communication skills
- Time arrangement
- Scrum Methodology
- Change of Client
- Change of Project Manager
- Managing Expectation

5. Conclusion

Learning Experience

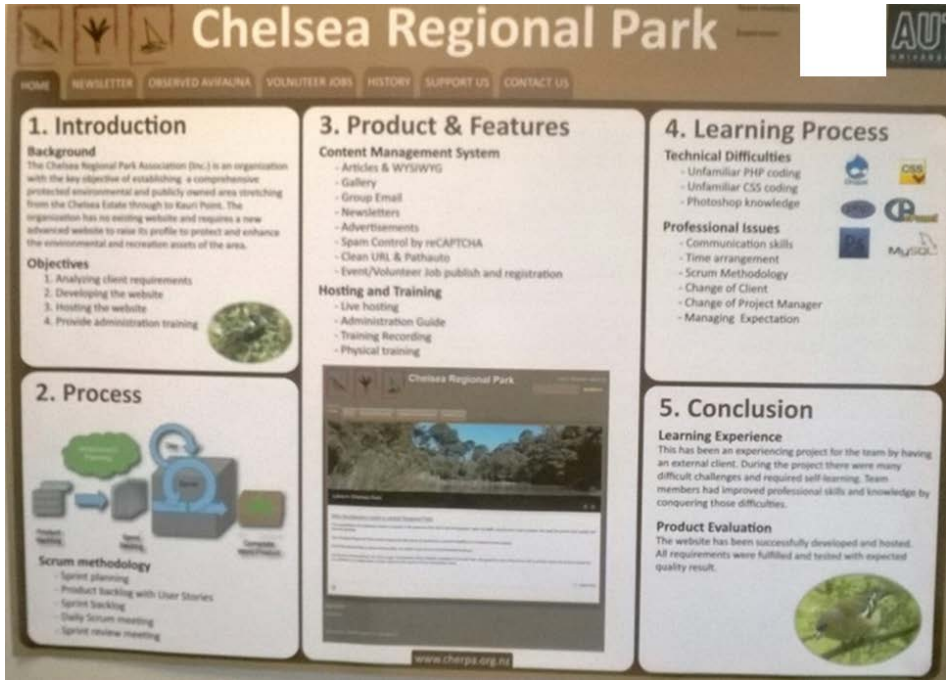
This has been an experiencing project for the team by having an external client. During the project there were many difficult challenges and required self learning. Team members had improved professional skills and knowledge by conquering those difficulties.

Product Evaluation

The website has been successfully developed and hosted. All requirements were fulfilled and tested with expected quality result.

Example Posters

- Flow clear.
- Nice images.
- Goals vague.
- Lack of content and depth. No real coverage of method.
- Unreferenced diagrams.
- Non-specific content on challenges or learning.



AUT UNIVERSITY

Research & Development: Semester 1, 2013

Central Authentication Server

fishpond.co.nz

Client: **Fishpond Ltd** *Supervisor:* **Sherlock Licorish**

Introduction

- Objectives
  - Enhance administrative control over servers access.
  - Improve server access security.
  - Update existing database structure to accommodate new infrastructure.
  - Integrate administration controls with the existing project management software.
- Company Background
  - Online store selling books, music and movies.
  - Australian and New Zealand Based.
  - Staff accessing servers internationally.
  - 50+ servers located in Amazon cloud.
- Project Background
  - Every developer can access ALL servers or none at all.
  - Emerging need for more specialized developers' teams.
  - Linux OS servers used by developers.
  - Redmine project management system used to keep track of development teams.
- Project Deliverables
  - Updated database structure to store server and group records.
  - Consistent PAM & NSS configuration template with the updated database.
  - Front-end administration controls integrated into Redmine.

Problem: Client Motivation

- Poor control over server access.
- Internal security threat.
- More specialized developer groups emerging.

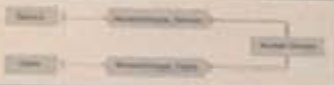
Benefits to client

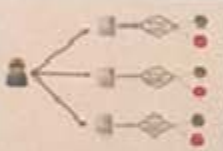
- Increased security.
- Added flexibility to user login control.
- Redmine integrated administration controls.

Solution

- Solution Scope
  - New database model
  - NSS & PAM authentication modules
  - Redmine front-end controls

- Updated database structure





- PAM & NSS
  - NSS retrieves database records for the user in relation to the group that itself belongs to
  - PAM authenticates by verifying username/password for the user
  - Configuration changes consistent with the updated database model

- Redmine plugin
  - Using existing Redmine infrastructure
  - Point and click interface.
  - Database front-end controls.
  - Utilizing extendable MVC architecture.
  - Consistent look and feel with the existing style.
  - Independent from the existing functionality.

Challenges

- Existing Linux based system, customized for business.
- Limited exposure to Linux OS.
- Custom built project management software based on Redmine.
- Initially, lack of understanding of existing system.

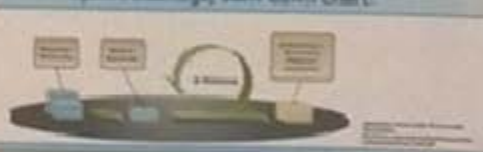
Process

Outline:

- Semester 1
  - Research Linux, MySQL, Ruby on Rails, PAM & NSS
  - Test data initialization, exploring test environment
- Semester 2
  - Database configuration
  - Implementation of PAM & NSS
  - Redmine plugin development

Methodology:

- Scrum
  - Rotating roles.
  - 2 weeks sprints.
  - Flexible scrum meetings.
  - Artefacts: product/sprint backlogs, burn-down chart.



Learning

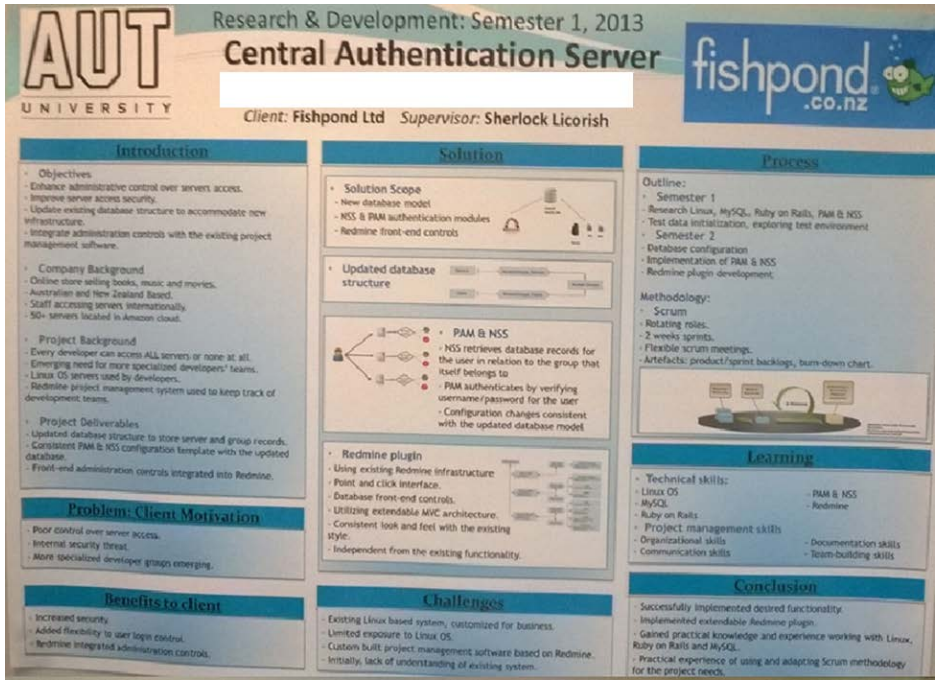
- Technical skills:
  - Linux OS
  - MySQL
  - Ruby on Rails
  - PAM & NSS
  - Redmine
- Project management skills
  - Organizational skills
  - Communication skills
  - Documentation skills
  - Team-building skills

Conclusion

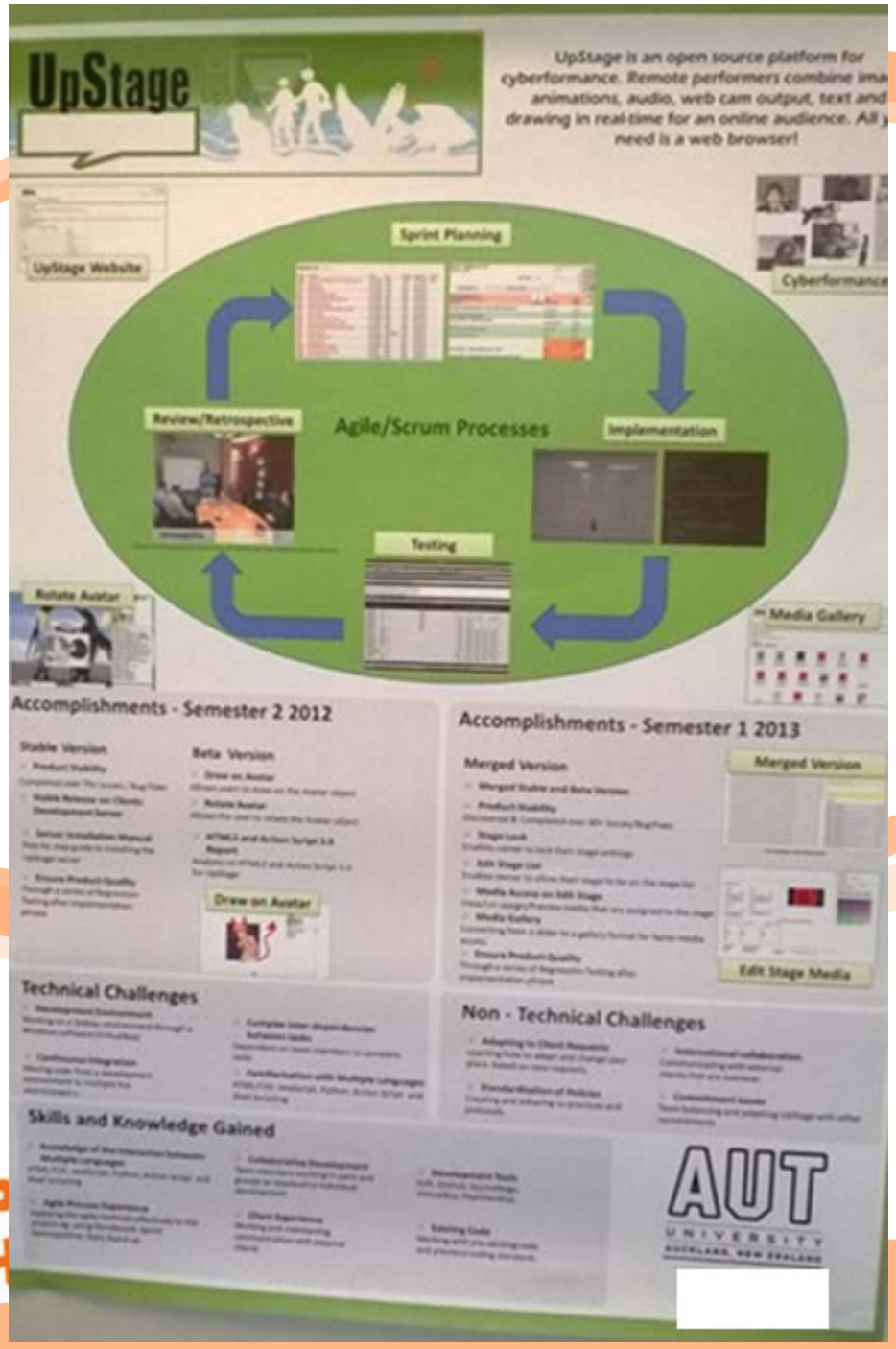
- Successfully implemented desired functionality.
- Implemented extendable Redmine plugin.
- Gained practical knowledge and experience working with Linux, Ruby on Rails and MySQL.
- Practical experience of using and adapting Scrum methodology for the project needs.

Example Posters

- Clear objectives
- Nice design.
- Diagrams referenced.
- Flow not clear.
- Too much use of bullet point lists.
- Lack of content and depth.
- Limited content on challenges or learning.



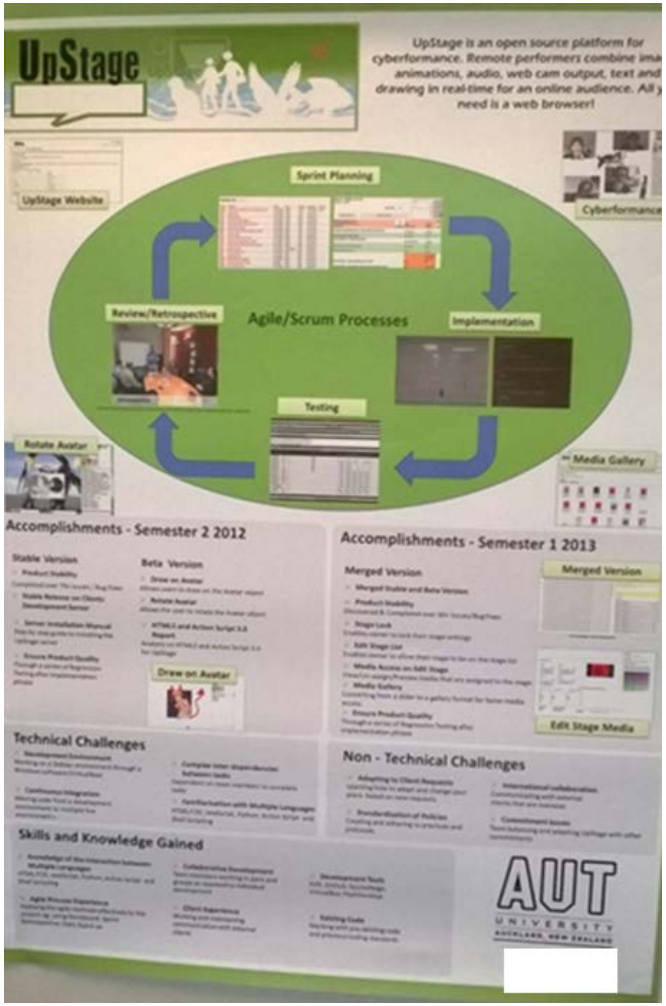
AUT UNIVERSITY COMPUTER + MATHEMATICAL SCIENCES



AUT UNIVERSITY COMP MATH

Example Posters

- Personalised images.
- Good coverage of achievements.
- Diagram too large.
- Goals and context not clear.
- Limited depth on learning and challenges.



AUT PRIZES

Client : Philippa Hay

Supervisor: Muhammad Usman

[redacted]

AUT UNIVERSITY

Semester 1 201

AUT Prizes – a new system

AUT has different prizes for postgraduate and undergraduate.
Each school stores prizes data in different ways.
Each school has a different amount of historical data.
"AUT prizes" is a web based system for managing AUT prizes.
"AUT prizes" consists of:

- A centralized database.
- A developed website that is connected to the database for data manipulation.

"AUT prizes" is a new management system with a higher security.

Scope and Requirements

The first part of the project was database development:

- Collecting data from stakeholders i.e. School managers
- Data analysis
- Database design.
- Importing existing data from excel sheets to our newly centralized SQL database.

The second part of the project:

- Design and development of a website
- Website testing
- Hosting the website

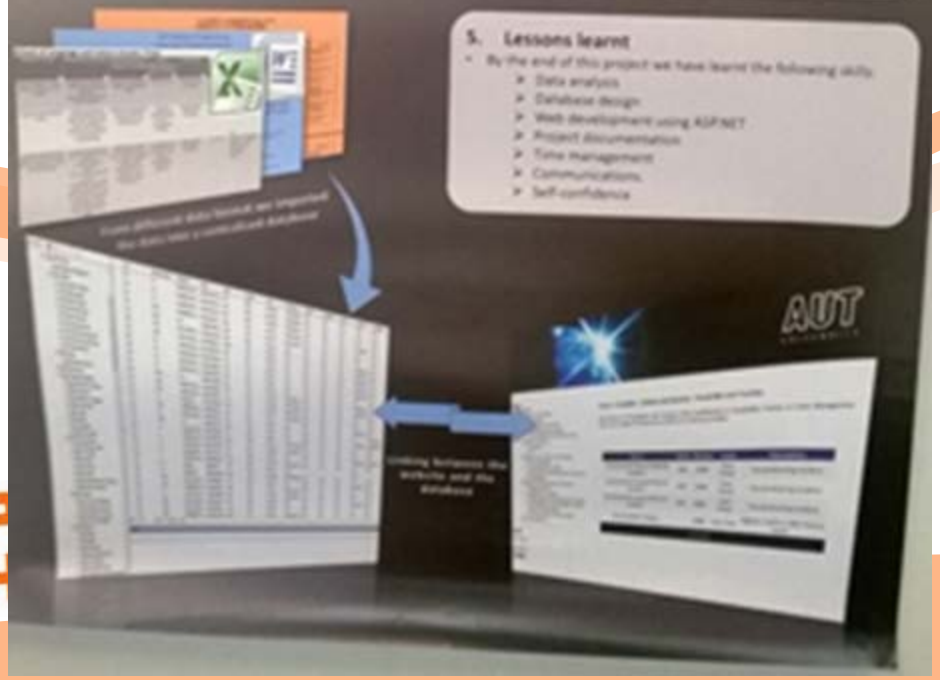
3. Technical and Non-Technical challenges

- We have encountered the following technical challenges:
  - Most of the data were not available in electronic format.
  - Importing data from different formats to a centralized SQL server database.
  - Publishing the website on WEBDEV WEB server.
  - ASP.NET platform and coding.
- We have encountered the following non-technical challenges:
  - Time management.
  - Requirement changes.

4. Final Product

The features of the final product:

- All data have been saved to the centralized database.
- Normal users can view all the awards from each school.
- School administrators have the ability to add data.
- Faculty administrators have the ability to approve the already entered data.
- The system has advanced functions for administrators for data handling and manipulation.



5. Lessons learnt

- By the end of this project we have learnt the following skills:
  - Data analysis
  - Database design
  - Web development using ASP.NET
  - Project documentation
  - Time management
  - Communications
  - Self-confidence

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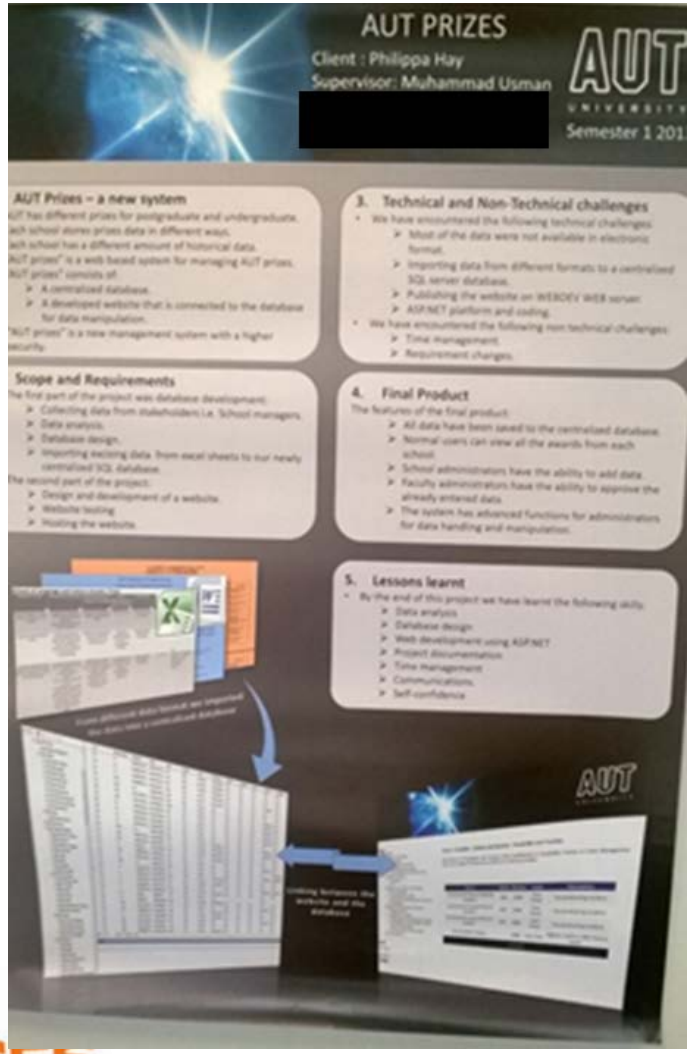
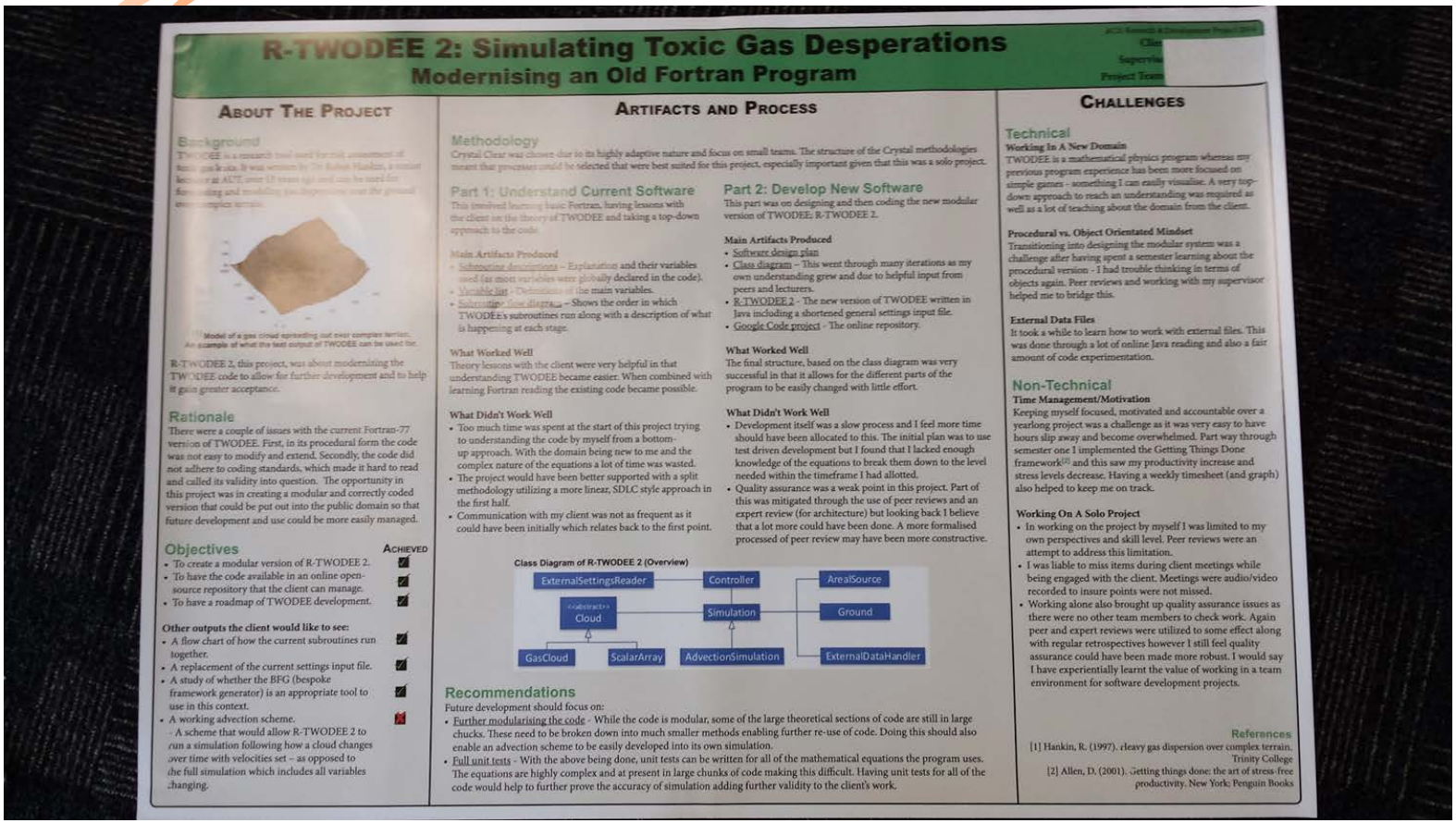
Example Posters

- Unclear goals
- No clear link between images and text
- Large portion of poster taken up with images
- Poor grammar
- Refers to Research Questions, but these questions are not given in the poster



Example Prize winning posters



R-TWODEE 2: Simulating Toxic Gas Desperations

Modernising an Old Fortran Program

About The Project

Background

TWODEE is a research tool used for risk assessment of toxic gas leaks. It was written by Dr Robin Hankin, a senior lecturer at AUT, over 15 years ago and can be used for forecasting and modelling gas dispersion over the ground over complex terrain.

Model of a gas cloud spreading out over complex terrain. An example of what the text output of TWODEE can be used for.

R-TWODEE 2, this project, was about modernizing the TWODEE code to allow for further development and to help it gain greater acceptance.

Rationale

There were a couple of issues with the current Fortran-77 version of TWODEE. First, in its procedural form the code was not easy to modify and extend. Secondly, the code did not adhere to coding standards, which made it hard to read and called its validity into question. The opportunity in this project was in creating a modular and correctly coded version that could be put out into the public domain so that future development and use could be more easily managed.

Objectives

	Achieved
• To create a modular version of R-TWODEE 2.	☑
• To have the code available in an online open-source repository that the client can manage.	☑
• To have a roadmap of TWODEE development.	☑
Other outputs the client would like to see:	
• A flow chart of how the current subroutines run together.	☑
• A replacement of the current settings input file.	☑
• A study of whether the BFG (bespoke framework generator) is an appropriate tool to use in this context.	☑
• A working advection scheme. - A scheme that would allow R-TWODEE 2 to run a simulation following how a cloud changes over time with velocities set – as opposed to the full simulation which includes all variables changing.	☒

Artifacts and Process

Methodology

Crystal Clear was chosen due to its highly adaptive nature and focus on small teams. The structure of the Crystal methodologies meant that processes could be selected that were best suited for this project, especially important given that this was a solo project.

Part 1: Understand Current Software

This involved learning basic Fortran, having lessons with the client on the theory of TWODEE and taking a top-down approach to the code.

Main Artifacts Produced

- Subroutine descriptions – Explanation and their variables used (as most variables were globally declared in the code).
- Variable list – Definitions of the main variables.
- Subroutine Flow diagram – Shows the order in which TWODEE's subroutines run along with a description of what is happening at each stage.

What Worked Well

Theory lessons with the client were very helpful in that understanding TWODEE became easier. When combined with learning Fortran reading the existing code became possible.

What Didn't Work Well

- Too much time was spent at the start of this project trying to understanding the code by myself from a bottom-up approach. With the domain being new to me and the complex nature of the equations a lot of time was wasted.
- The project would have been better supported with a split methodology utilizing a more linear, SDLC style approach in the first half.
- Communication with my client was not as frequent as it could have been initially which relates back to the first point.

Part 2: Develop New Software

This part was on designing and then coding the new modular version of TWODEE, R-TWODEE 2.

Main Artifacts Produced

- Software design plan
- Class diagram – This went through many iterations as my own understanding grew and due to helpful input from peers and lecturers.
- R-TWODEE 2 - The new version of TWODEE written in Java including a shortened general settings input file.
- Google Code project - The online repository.

What Worked Well

The final structure, based on the class diagram was very successful in that it allows for the different parts of the program to be easily changed with little effort.

What Didn't Work Well

- Development itself was a slow process and I feel more time should have been allocated to this. The initial plan was to use test driven development but I found that I lacked enough knowledge of the equations to break them down to the level needed within the timeframe I had allotted.
- Quality assurance was a weak point in this project. Part of this was mitigated through the use of peer reviews and an expert review (for architecture) but looking back I believe that a lot more could have been done. A more formalised processed of peer review may have been more constructive.

Class Diagram of R-TWODEE 2 (Overview)

Recommendations

Future development should focus on:

- Further modularising the code - While the code is modular, some of the large theoretical sections of code are still in large chucks. These need to be broken down into much smaller methods enabling further re-use of code. Doing this should also enable an advection scheme to be easily developed into its own simulation.
- Full unit tests - With the above being done, unit tests can be written for all of the mathematical equations the program uses. The equations are highly complex and at present in large chunks of code making this difficult. Having unit tests for all of the code would help to further prove the accuracy of simulation adding further validity to the client's work.

Challenges

Technical

Working In A New Domain

TWODEE is a mathematical physics program whereas my previous program experience has been more focused on simple games - something I can easily visualise. A very top-down approach to reach an understanding was required as well as a lot of teaching about the domain from the client.

Procedural vs. Object Orientated Mindset

Transitioning into designing the modular system was a challenge after having spent a semester learning about the procedural version - I had trouble thinking in terms of objects again. Peer reviews and working with my supervisor helped me to bridge this.

External Data Files

It took a while to learn how to work with external files. This was done through a lot of online Java reading and also a fair amount of code experimentation.

Non-Technical

Time Management/Motivation

Keeping myself focused, motivated and accountable over a yearlong project was a challenge as it was very easy to have hours slip away and become overwhelmed. Part way through semester one I implemented the Getting Things Done framework[2] and this saw my productivity increase and stress levels decrease. Having a weekly timesheet (and graph) also helped to keep me on track.

Working On A Solo Project

- In working on the project by myself I was limited to my own perspectives and skill level. Peer reviews were an attempt to address this limitation.
- I was liable to miss items during client meetings while being engaged with the client. Meetings were audio/video recorded to insure points were not missed.
- Working alone also brought up quality assurance issues as there were no other team members to check work. Again peer and expert reviews were utilized to some effect along with regular retrospectives however I still feel quality assurance could have been made more robust. I would say I have experientially learnt the value of working in a team environment for software development projects.

References

[1] Hankin, R. (1997). Heavy gas dispersion over complex terrain. Trinity College

[2] Allen, D. (2001). Getting things done: the art of stress-free productivity. New York: Penguin Books

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Example Prize winning posters

Effective Posters

- http://www.ncsu.edu/project/posters/

Content

Project Name: .....

Criteria	Grade
Content 50% • Outlined project objectives and rationale • Project artefacts (e.g. architecture, models, design, software, client deliverables) • How artefacts were produced • Areas of greatest challenge • Areas of greatest technical difficulty	
Presentation of poster 20% • Clarity of poster presentation • Effective technology/artefact • Spelling and grammar • Audience appeal	
Team/Individual Explanation 30% • Reflection on lessons learned • Demonstrated critical thinking • Fluent handling of questions	**NA**

Overall Grade

A+	**A**	**A-**	**B+**	**B**	**B-**	**C+**	**C**	**C-**	**D**	**D**

Other Details

- Title
- Client Organisation/name
- Names of team members
- Name/s of supervisor/s
- Date (S1 2015)
- AUT-logo and company logos optional

Audience

- Assessment teams, Advisory committee, AUT guests (dean), clients from industry, other project students.
- **To satisfy the audience,**

1. Give a short introduction – the big picture.
2. Use plain language
3. No jargon
4. Give explanations, interpretations
5. Connections to related fields
6. Be honest, critical
7. Provide ideas how to continue

Printing

- Done by PrintSprint on A1. Paid for by AUT. Each team needs to collect a form at reception in Week 13. There will be a reminder announcement on AUTOnline.
- Deliver your work to PrintSprint as a PDF file
- Allow time for printing (2 days minimum).
- Attachment with Velcro fasteners on dividers (provided)

Poster Session

Thursday June 18th

Arrive 8:30am to prepare and put up poster.

Marking: 9am to 12:30pm

- WT Level 2
- You will receive a schedule with instructions for the day