# Aber Fitness Project

Computer Science Department • Aberystwyth University

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## Introduction

The group project for the module SEM5640, Developing Advanced Internet-based Applications, asks you to work in groups to develop a distributed application. This document provides the main information about the organisation of the project. A separate document will provide the specification about what is required from the software.

## Problem Statement

You have been asked to develop a distributed application to support the collection and processing of activity data and ways to set challenges, process the results of the challenge and run a sports ladder.

The Requirements Specification [1] contains details of the application's requirements.

## Equipment

This task involves reading data from Fitbit devices. We will provide some test devices that can be used for the duration of the project.

## Ethics

The focus of this project is on the technologies and the ability to collect and manage data. It does raise an ethical issue in the collection and processing of personal data. As with your 3rd year project, there will be an ethics application completed for the project. As a result of that, we will discuss with you separately any requirements about the data that can be stored and how it will be processed.

## Development Methodology

As a group you must choose an appropriate methodology, manage the project accordingly and report on the suitability and efficacy at the end. We suggest that you should include the following aspects:

1. **Prototyping / Spike Work** – As an aid to understanding the technology, developing a design and enhancing the requirements you should probably build small pieces of functionality at an early stage.
2. **Pair Programming** – At least some aspects of this system, particularly those involving novel technologies, may be best tackled using this approach.
3. **Testing** – The group needs to agree a plan for testing. This should be done early in the project. Test-driven development is a common technique for web applications and should be considered by your group.

We will discuss some of the possible development methodologies. We will revisit this choice as you start the project and discuss suitable approaches. Whatever you choose, you should follow the methodology and provide suitable evidence.

## Development Techniques

By undertaking this assignment, you will:

- Demonstrate that you know how to use the Java EE technologies including JPA Entities and EJBs.
- Demonstrate that you know how to configure, package and deploy EJBs and JPA Entities to a Java EE application server.
- Demonstrate that you know how to use C# and ASP.NET Core to develop a system, including data storage and retrieval.
- Demonstrate that you know how to build simple web services to support interoperability between different platforms.
- Demonstrate that you are able to develop appropriate diagrams during the design process and translate the diagrams into code.
- Demonstrate that you know how to construct suitable tests and then test the application.

## Milestones, Deliverables, Submission Dates and Instructions

### Milestones

You should choose a development methodology and then have an appropriate project plan specified as soon as possible. Its detail will depend on your methodology. As an initial guide, we propose the following milestones:

**October 26th:** Initial project plan

**November 9th:** Architectural design

**November 16th**: Test Plan

### Deliverables

The project is divided into three components:

1. **Group Work** – You will work in groups to specify, design, implement and test a solution to each part of the initial requirements. You will document your system and the experience of working on the system. As part of the documentation, your group will critically assess the effectiveness of the solution.
2. **Group Presentation** – Your group will prepare and present a demonstration about the outcomes of your project.
3. **Individual Report** – You will write an individual report that reflects on your own contribution to the group and the effectiveness of the group work.

The marking scheme for these components is described at the end of this document.

### Submission Dates

Table 1 specifies the submission dates for the different components. The group report and all associated technical work (referred to as the 'Group Work') is due first, followed by your Individual Report. You should complete a declaration of originality form and submit it with your Individual Report.

Your group is then expected to make a presentation to demonstrate your approach and solution to the problem.

This assignment is **not** marked anonymously.

| Description | Date | Time |
|---|---|---|
| The project hand out date. | Tuesday 16th October 2018 | 15.10 Lecture |
| The group documents hand in date. See below for details of the submission. | Monday 17th December 2018 | 3pm, Electronic Hand in on Blackboard |
| The individual report. See below. | Tuesday, 8th January 2019 *(Provisional)* | 3pm, Electronic Hand in on Blackboard. *To be confirmed.* |
| Group Demonstration. Your group will have 30 minutes for the demonstration and time for questions. | Wednesday, 16th January 2019 (*Provisional*) | *To be confirmed* |

**Table 1: Submission Dates**

**Note:** The dates for the individual report and the group demonstration will be confirmed when the final examination timetable is confirmed for Semester 1.

## Group Work

All code and documentation must be managed using the department's Gitlab repository, which will be set up for you. The lecturing staff on the module must have read access to your repository.

The group must hand in a ZIP file of the project materials, which should be a checkout of the final state of the repository and therefore contain:

- IntelliJ IDEA project(s)
- Visual Studio project(s).

You must include all source code and additional files within your IntelliJ IDEA/Visual Studio projects. If you choose to use other IDEs, then you need to provide the relevant project files for the IDEs that you select.

You must also write a group report and submit an electronic copy. The electronic copy must be a PDF file.

The group report should be approximately 10,000 words and it should include the following sections and content.

- **Overview**. You should provide a one-page description of the key outputs of the project.
- **Requirements**. You should describe the final set of requirements that you agreed on with the client. These will be based on the initial set of requirements that are provided at the start of the project.
- **Development methodology**. You should provide a description of and rationale for your development methodology.
- **Design**. You should explain the design that you have adopted for the different systems and how you will integrate the systems. This should include UML diagrams for appropriate parts of the system. You should also provide an associated textual description.
- **Implementation**. You should discuss how the group developed the system. It should provide details of problems encountered and how your group overcame any technical challenges.

- **Testing**. Your test plan and tests that you have performed on your system should be provided.
- **Status**. The current status of the applications with respect to functionality and any bugs should be reported.
- **Critical Evaluation**. As a group, you should critically evaluate a) the suitability and efficacy of the development methodology adopted and b) the outputs that you have produced. If the group started again, how would you approach the problem differently?

You can include other relevant documentation as appendices to the main group report.

## Individual Report

You must also complete a separate individual report that evaluates the project and your work on it from your perspective. The individual report should be approximately 3,000 words. It should include the following sections and content.

- **Personal Evaluation**. Discuss your contribution to the project, including the areas that you worked on and how you worked as part of the team. Critically evaluate your own work and reflect on how you might do things differently if you started again.
- **Group Evaluation**. Discuss how the group worked from your perspective. How successful was the development methodology? Would you support using the development methodology again? Critically evaluate the performance of the group and reflect on how the group might do things differently if you started again. This evaluation is focused on your personal view of the group.

During the project, you should keep an individual project blog. These will be setup for you on Blackboard. You should use this to record the work you are doing and any issues you encounter and how you addressed them.

You must submit the report as a PDF document for assessment. The blog forms part of your individual assessment. You do not need to submit your blog separately.

## Group Presentation

The group presentation should describe and demonstrate what you were able to achieve in the time available. You should discuss the technologies used and any problems that you encountered and how you addressed them. In the group presentation, you will be assessed on the quality of the presentation and your ability to demonstrate an understanding of the technical issues.

## Amount of Effort

The overall project is expected to take approximately 200 hours per person. It is suggested that you split your time between the different tasks in the following way:

| Description | Hours |
|---|---|
| Group Development. This includes all of the time for meeting, document writing, design, development and testing. | 170 |
| Group Demonstration. This includes your time to meet and discuss the content as a group, the time to prepare for the actual demonstration and the time for the meeting. | 10 |
| Individual Report, including time to write about your progress in your blog. | 20 |

## Meetings

You are expected to meet weekly with your manager to update on progress. You should also arrange regular meetings with your team members; your team meetings may be more regular than once a week. Your manager will act as a liaison with the client. To resolve questions about the requirements, you should discuss them with the manager in the first instance.

## Marking and Participation

By default, all group members will receive the same mark for the group elements.

If during the course of the project a group feels that a team member is not contributing sufficiently, members of the group should approach the module co-ordinator to discuss the issue. The group member will be asked to meet with the module co-ordinator to discuss the matter. If it is agreed that the group member is not contributing, they will be issued with a Yellow card. At the same time, explicit targets will be set which, if met, will lead to removal of the card. If the group member does not meet the targets, higher levels of card may be issued. Penalties apply to cards remaining at the end of the project.

| | | |
|---|---|---|
| Yellow card | Student has not participated sufficiently, or has failed to provide promised contributions without good reason. | Penalty: 20% of the group mark (the student receives 80% of the group mark) |
| Orange Card | Student has received yellow card and has continued to default. This will also result in an interview with the Head of Department. | Penalty: 40% of the group mark (the student receives 60% of the group mark) |
| Red Card | Student has not improved behaviour after interview with Head of Department. | Penalty: All marks lost. Zero is awarded for the group project. |

Conversely, where one person makes an outstanding contribution that stimulates a struggling group so as to turn potential failure into success then that person's marks may be increased. The marks of the remainder of the group may be adjusted to compensate.

Adjustments will be made on the basis of the evidence in the group and individual reports and the project SVN repository. Groups should recognize that where a person has done very little because he/she has not been given much to do, but has done consistently all that they were called upon to do, that person's mark will not be adjusted.

## Assessment Criteria

The work will be marked in accordance with the Assessment Criteria for Development, which is found in Appendix AA of the Student Handbook for Computer Science [2].

## Marking Scheme

The marking scheme for the project is described below.

| | | |
|---|---|---|
| **Group Project Work**<br>This is based on the information provided in the group report, appendices and the associated code. | | |
| Analysis, process and design | Is there a suitable analysis of the problem, including the updated requirements specification? Is the chosen development methodology explained and justified? Are there design diagrams? Is there an associated textual description? Is there rationale for the design choices made? Does the design address the stated requirements? | 15% |
| Implementation in JavaEE and .NET | Demonstration of successful operation of the components in the system. Do the microservices run? Do they make use of appropriate facilities of the development platform? | 30% |
| Interoperability | Demonstrate the successful integration of the systems using web services. Appropriate design of the web service interface. | 10% |
| Testing | Discussion of testing strategy and details of the results. | 15% |
| Evaluation | Discussion of the strengths and weaknesses of the project and any comments about the similarities and differences between the platforms. | 10% |
| **Group Presentation**<br>This is based on the presentation and demonstration. | | |
| Demonstration | There will be a joint presentation that should explain how you approached the problem and how your solution operates. All group members should take part. | 10% |
| **Individual Report**<br>This is based on an individual report and your project notebook. | | |
| Personal Evaluation | Provide a critique of your individual contribution to the project. This is demonstrated through your report and the project notebook. | 5% |
| Group Evaluation | Provide a critique of the approach used by your group. How successful was the choice of development methodology? What problems did you encounter? How did you solve them? | 5% |
| TOTAL | | 100% |

## References

[1] Computer Science Department (2018) “SEM5640 Group Project. Aber Fitness Project. Requirements Specification.” Ref: SEM5640.2018.RS

[2] Computer Science Department. (2002) "Appendix AA – Assessment Criteria for Development.” Available online. http://www.aber.ac.uk/~dcswww/Dept/Teaching/Handbook/AppendixAA.pdf (Accessed 16th October 2018)

**DOCUMENT HISTORY**

| Version | Date | Changes made to document | Changed by |
|---|---|---|---|
| 1.0 | 2018-10-15 | Draft Version. | NST |
| 1.1 | 2018-10-16 | Updated marking scheme. | NST |
| 1.2 | 2018-10-16 | Status set to release. | NST |