Data Structures and Algorithms

Lecture 0 — Introduction

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Programming Component of DS&A

- General Details are on the Programming Component of the Canvas module page
- 5 assignments, one every 2 weeks, first one doesn't count for module marks
- Assignments are based on the Theory part, but go beyond what is covered there:
  - Application of DS&A in Java
  - Design, implementation and use of new DS&A
  - Professional methods and tools for design, developing, debugging and testing quality code
- Assignments are marked programmatically
- In the first week: Learn basic use of Eclipse, Unit testing, Logging
- In the second week: do first assignment

GIT

GIT is a distributed version control system

- We will learn more about it later in the module. In particular, you will use it for your own work.
- For the moment, you can think of it as a mechanism to share and backup files
- For this module I will share assignment files and handouts via the repository:
  `https://git.cs.bham.ac.uk/aps/dsa-2019.git`
- Get an initial copy with the command line:

  ```
  git clone https://git.cs.bham.ac.uk/aps/dsa-2019.git
  ```

- Get the latest updates by changing directory to the resulting `dsa-2019` directory and running the command:

  ```
  git pull
  ```

- Do not make any changes within this directory: if you want to make changes, copy the files out to your own directories

Video-store repository

There is one other GIT repository that we will use to

- demonstrate what a java project repository looks like
- to provide sample source code to show how unit testing and logging works
- to provide a software basis for an approach to code quality improvement topic that we will consider later in the module: refactoring

The repository is:

`https://git.cs.bham.ac.uk/aps/video-store.git`

Lab sessions

- There are 3 Lab sessions a week, session A, B and C
- Each student should normally only go to 1 session
- The file `https://birmingham.instructure.com/courses/31125/files/6630586` is a table showing which student is in which lab session group.
- To find this file through the Canvas module: Go to the canvas page for the module At the bottom of the home page, follow the link to the "Programming Component". In the section on "Lab Sessions", right after the lab session times, there is a link "DSA_Student_Groups.txt"
- Lab sessions will be:
  - Group A: Tuesday 10:00-12:00
  - Group B: Thursday 10:00-12:00
  - Group C: Friday 11:00-13:00

Handouts in the dsa-2019 repository

There are 4 handouts in the dsa-2019 repository

- l00-intro.pdf: this file
- l01-Eclipse.pdf: Detailed instructions on how to configure Eclipse, create a project using logging and unit testing and run it. There are no explanations of how to write logging or unit testing code. For that you have to look at the other handouts
- l02-Testing.pdf: Information on how to use the JUnit testing framework. This handout assumes that you have worked through most of the Eclipse handout and have set up Eclipse correctly, configured the libraries and can execute tests
- l03-Logging.pdf: Information on how to use the log4j logging framework. As with the testing framework, you should have worked through most of the Eclipse handout first

Work for first week

For the first week in the lab, your objective should be to:

- Clone the two repositories dsa-2019 and video-store
- Work through the entire setup part of the Eclipse handout until Eclipse is configured, you can set up a project, and you can compile and run the tests on the video-store project. You do not need to master debugging in Eclipse this week, but if you have time it would be worth your while to try it out.
- Learn enough from the Testing handout to be able to create your own tests. Try adding more tests to the video-store. Try modifying the main code in video-store so that it fails some tests so that you can see what that is like and can understand the messages it generates. More advanced material in the handout can be left to another time (e.g. parameterised tests)
- continued on next slide...

Work for first week continued

- Learn enough from the Logging handout to be able to add log statements comfortably. For the moment you can leave more advanced usage (e.g. more complex configuration files) to later.
- Overall you need to learn to become competent in Eclipse, and master basic use of JUnit and log4j as soon as possible so that you have good tools to work on the assignments from week 2 on.
- Over the following few weeks, you should work to extend your mastery in all three areas.