COMP2005
Software Development Tools and Practices

20 CREDIT MODULE

ASSESSMENT: 100% Coursework **W1: 30% Set Exercises**
W2: 70% Report

MODULE LEADER: Dr Mark Dixon

MODULE AIMS

- To explore software development best practices such as usability, unit testing, TDD, version control and quality management.
- To develop an awareness of current industry tools for automation of builds and release of software systems.
- To create appropriate test plans and test cases making use of modern testing tools and processes.
- To examine a variety of techniques to evaluate a given UI.

ASSESSED LEARNING OUTCOMES (ALO):

1. Analyse the issues that are important in selecting a set of tools for the development and release of a software system.
2. Describe and distinguish the different types of and levels of testing.
3. Create and document a set of tests for a medium sized software project.
4. Demonstrate the capability to use software tools in support of the deployment of a software product.

Overview

This document contains all the necessary information pertaining to the assessment of *COMP2005 Software Development Tools and Practices*. The module is assessed via **100% coursework**, across two elements: *30% Set Exercises* and *70% Report*.

The sections that follow will detail the assessment tasks that are to be undertaken. The submission and expected feedback dates are presented in Table (1). All assessments are to be submitted electronically via the respective DLE module pages before the stated deadlines.

	Submission Deadline	Feedback
Set Exercises (30%)	2nd May 2023 @ 15:00	within 20 working days
Report (70%)	9th May 2023 @ 15:00	within 20 working days

Table (1): Assessment Deadlines

All assessments will be introduced in class to provide further clarity over what is expected and how you can access support and formative feedback prior to submission. Whilst the assessment information is provided at the start of the module, it is not necessarily expected you will start this immediately – as you will often not have sufficient understanding of the topic. The module leader will provide guidance in this respect.

Assessment 1: Set Exercises

1. Ask me!

If you have any queries whatsoever about this assignment, please come and talk to me in the lab. This is the very best way to get answers. Alternatively, email me l.stuart@plymouth.ac.uk so I can clarify anything that is unclear.

My best TIPs to getting a good mark in your Set Exercises are

- start early and work consistently week after week
- make the most of your time with me in the labs
- be absolutely meticulous with the order of content in your video.
- make sure you follow the time guidelines given ending your video at 5:00 minutes.

All the very best from Liz 😊

2. What do you need to do?

You are required to select a software application and evaluate it using a questionnaire. Once you have collected data from at least FIVE participants, you will analyse the data and use your findings to redesign the software. Your new design should then be demonstrated using a paper prototype. Finally, evaluate your redesign by carrying out one cognitive walkthrough with one peer.

Complete each of the following Set Exercises:

(a) **Select a piece of software** to evaluate. This must be unique; not the same as anybody else in the class.

- Ensure you choose software that is sufficiently large in complexity to get the most out of these exercises.
- To keep track of who is using which website there will be a shared excel spreadsheet where you can register the website you have chosen to assess.

(b) **Carry out an online survey** to evaluate the software

- Start by planning what data you need to gather.
- Then, you will need to think about what questions will you ask and how you should ask them. Spend time making sure you have got this part well done.
  - Historically, students have rushed this part and lack of data has resulted in a lower mark.
- Create the online survey and carry as an initial TEST
  - This is professional practice as it identifies where you have issues in your survey
  - Identify a peer who is willing to give you honest and constructive criticism.
  - Ask them to complete your questionnaire.
  - Afterwards ask them to go through it again, question by question critiquing how you have worded the questions.
    - Did they understand what you were asking?
    - Did the wording make sense? Could it be improved?
    - Did you use an appropriate scale for quantitative responses?
    - Will the data you have collected provide the answers you need? Will it be enough to identify the issues; where they are and what they are?
- Make any corrections or changes to your evaluation process as required.
- Run the survey

- You will need to recruit 5 or more participants.
  - Note that the ethical approval covers you to use other Plymouth University students as well as family and/or friends.
  - Note that everyone you test must be over 18 years old.
- Get your survey completed by 5 or more people

(c) **Redesign the software.** Demonstrate your changes using a **paper prototype**

- Please **do not code** any changes. There are no marks for coding the redesign of the software.
- Create a physical paper prototype of the 'new' improved version of the software

(d) Carry out a **Cognitive Walkthrough** with one Peer

- This will enable you experience the usefulness of paper prototyping
- Give a brief report on this in your video

(e) Finally, create a 5-minute **video submission** as specified below:

- Your video will be the only submission for the COMP2005 Set Exercises.
- It is your responsibility to ensure it is complete.
- Your video will be paused for thorough reading.
- Please do not read your slides to me.
- Marking will end at 5:00 minutes exactly.
- Please ensure all text is big enough for me to read.

3. What do you need to submit?

The structure and order of content in your video is extremely important. Your video MUST be structured as specified in the following table. Please be very careful and pay close attention to these instructions. I want you to score as many marks as possible.

Content	Details	Marks
SECTION 1	Clearly mark the start of this section as Section 1.	20
Present the **software** you selected	○ Use around ½ a minute for this section. ○ Tell me what I need to know about this software. What was its purpose? ○ The quality of your presentation/video will be assessed in this section too.	
SECTION 2	Clearly mark the start of this section as Section 2	30
Describe your **online survey** and the process of **data collection.**	○ Use around 1½ minutes for this section. ○ Tell me about your about your survey; the process you went through, about your participants etc. What did you actually do? How did you collect data? from Whom? ○ NOTE: You do not need to report on your process of analysis – just data collection. The product of your analysis id your redesigns.	
SECTION 3	○ Clearly mark the start of this section as Section 3	

Describe your **redesign** ideas	○ Use around 2½ minutes for this section.
	○ Use your paper prototype to communicate how you would change the software to overcome each of the issues you identified in your data analysis.
	○ For each redesign idea
	  ○ Make sure you clearly identify the area of the screen you are describing (outline line the area using your mouse).
	  ○ Show clearly what the software was like before.
	  ○ Show clearly what the software is like now (i.e. what you are suggesting to improve it).
		40

	○ Show any number of redesigns in the time you have left for this section.	
SECTION 4	Clearly mark the start of this section as Section 4	10
Report on the one **cognitive walkthrough** you carried out with a peer.	○ Use around ½ minute for this section. ○ Provide a brief report on the Cognitive walkthrough. ○ Can you see how paper prototypes would be used in them? ○ Do you think you would ever use a paper prototype followed by a Cognitive walkthrough in developing software? Why?	

Table (2): Precise structure of your video

4. How do you submit?

Your video must be made available via YouTube. It should meet the following quality criteria:

- Strictly follow the content structure given so you do not incur any penalties.
- The video length should not be more than 5 minutes long. You must not speed up your video to gain more time. Marking will stop at exactly 5:00. No exceptions. Note, last year, some students scored lost marks because they videos went beyond the 5:00 cut off. Therefore, they got no marks for all the ideas they presented after that point.
- The resolution of the video should be 720p to 1080p.
- Show only the application, not you on your webcam. Please remember to narrate what you are showing, it is not supposed to be a silent movie. Also, please do not read your slides to me. Just explain what it is you are showing me on the current screen.
- Use the free obsproject (https://obsproject.com/) software if you do not have any that is appropriate.

Please submit the link to your YouTube video by copying the link into a pdf document and submitting the file on the DLE.

- Please ensure you submit the link to the hosted video, NOT the video itself.
- The video must be hosted on YouTube and unlisted; please check permissions. If you mark it as private it will not be viewable and therefore unable to be marked.
- Note that last year, some students failed their Set Exercises because they did not check their video was accessible to others. My suggestion is that ask a friend to test whether they can access your video before you submit it.

5. How will your work be marked?

COMP2005 - Assessment 1 – Assessment Criteria/Feedback Template

Video	**Grade**
Section 1 - Present the **software** you selected.	**/20**
Section 2 - Describe your **survey** and **data collection** process.	**/30**
Section 3 - **Explain & demonstrate how you would redesign** your software to overcome the issues you identified.	**/40**
Section 4 – Report on your **Cognitive Walkthrough**	**/10**
In this section, I will provide feedback comments on your video of Set Exercises. These will include comments about where your work was weak as well as comments where your work was very good, and you demonstrated your professional skills well.	**/100**

Table (3): Criteria/Feedback Template Assessment 1 – Set Exercises

This is the Threshold Criteria (these are indicative only)

Criteria	**Fail (<40%)**	**Pass (40%+)**	**Merit (60%+)**	**Distinction (70%+)**
Video – Section 1. Present the **software** you selected.	× No software selected. × No or inadequate description of the software selected. × No video for this section.	✓Acceptable choice and description of the software selected.	✓Good choice and description of the software selected.	✓Comprehensive choice and detailed, clear description of the software selected.
Video – Section 2. Describe your **survey** and **data collection** process.	× No survey created. × No survey data collected. × No or inadequate description of the survey questions × No or inadequate description of the data collected. × The video for this section does not exist or play.	✓ The quality of the survey was adequate. ✓ The video included an adequate description of your survey including all the questions asked. ✓ The video included an adequate description of the data you collected.	✓ The quality of the survey was good. ✓ The video included a good description of your survey including all the questions asked. ✓ the video included a good description of the data you collected.	✓ The quality of the survey was excellent. ✓ The video included a comprehensive description of your survey including all the questions asked. ✓ the video included a comprehensive description of the data you collected.
Video – Section 3. **Explain & demonstrate how you would redesign** your software to overcome the issues you identified.	× No paper prototype created. × No redesign of the software. × The video for this section was not submitted or does not play.	✓A basic paper prototype was created. ✓The software was subsequently redesigned to overcome some of the issues in the software.	✓A good paper prototype was created. ✓The software was subsequently redesigned to overcome many of the issues in the software.	✓A highly detailed, thorough paper prototype was created. ✓The software was subsequently redesigned to overcome most of the issues in the software.
Video – Section 4. Report on your **Cognitive Walkthrough**	× No Cognitive walkthrough was reported in the video. × The video for this section was not submitted or does not play.	✓The Cognitive Walkthrough was carried out professionally and yielded some of the expected outcomes.	✓The Cognitive Walkthrough was carried out professionally and yielded many of the expected outcomes.	✓The Cognitive Walkthrough was carried out professionally and yielded most of the expected outcomes.
Feedback Overall	*Additional feedback*			

Table (4): Threshold Criteria for Assessment 1 - Set Exercises

Assessment 2: Report Automated Software Testing

This assignment contributes **70%** of the total mark for COMP2005 and is an **individual assignment**. The **final submission** must be submitted to the DLE by the indicated date.

Task Software Testing

For the purposes of this assignment, you have been provided with a Hospital Maternity Unit Web-Service API that serves information about a UK Hospital Maternity Unit, including information with dates regarding patient admissions. Your task is to create software that fulfils some specified business requirements, and to ensure that this software functions as expected by **implementing** and **documenting** a set of tests.

In order to fulfil the business requirements specified by the customer, you should build a web-service API that provides endpoints for the following functionality:

- A list of patients seen by a specific member of staff
- A list of patients who were discharged within 3 days of admission
- Identify which day of the week has the most admissions
- The average duration of patient stays for a specific member of staff

You do not have to provide a graphical user interface for the software – but your program is expected to connect to the Hospital Maternity Unit Web-Service API and provide its own endpoints. The code will be run by executing the different tests that you will provide.

Your software must parse the JSON data to fulfil the requirements specified above. The API can be found at (http://web.socem.plymouth.ac.uk/COMP2005/api) and includes its own specification (showing endpoints and return information).

In order to test your software, you must demonstrate a range of testing approaches:

- Unit testing, using mock objects.
- Integration testing, **combining unit tests** in addition to your software with the API.
- Functional tests, testing that the software meets the specified business requirements.

An important part of the assignment is how to plan and design your tests. You should consider edge cases and corner cases to ensure that the system is properly tested, as well as considering aspects such as code coverage. The software development tools and techniques discussed during the module **should be incorporated**.

Deliverables

There are three deliverables for this assignment:

D1: A report describing the test strategies (the **tables in the report** should describe the different kinds of tests (i.e., unit tests, integration tests, functional tests), inputs, and any (pre) conditions) for the task.

D2: The code you have written (both the software and the tests). This should be submitted on the DLE and shared on Github as well. (Remark: Use your real names for your Github account, not nick names, and share it with the account *md-supervisor)*.

D3: A video of ***5 minutes*** in which you present the software, describe your contribution and the different tests, and show a demo of the code working.
These deliverables must be submitted to the DLE on the submission deadline as a single ZIP file. The report should have a complete description of the testing strategy. It should include:

- A detailed discussion and analysis for **Task (1)**.
- A description of the test cases you have designed (**Task 2**).
- A description of the structure and role of any mock objects you have used (**Task 2**).
- An explanation of how to run the **unit and integration tests**, and **continuous integration** (in code environment) (**Task 2**).
- Your functional test plan (**Task 2**).
- A critical analysis of your test strategy, explaining why you have tested the software in the way that you have (**Task 2**).

Assessment and Feedback

The total marks of **Report** and **Task** constitute **100%** of the total mark of the coursework (the report part) and they are divided as follows (subject to moderation – usually no more than 10% mark reallocation may be undertaken after submission for moderation purposes):

Report	
Thoroughness of Analysis and Discussion	/15
Task	
1. Unit Tests	/20
2. Integration Tests	/20
3. Functional Tests	/12
4. Test and Validation Metrics (e.g., *Code Coverage*)	/10
5. Use of Tools, Practices, and Systems (e.g., *Version Control, Continuous Integration*)	/13
6. Quality of Report and Video	/10

Overall (Task 1 & Task 2)	100%

Table (5): Feedback and Assessment Template for the Coursework (Report)

Threshold Criteria (These are indicative only)

Fail

- You have submitted no or few unit tests and/or integration tests and they do not work properly.
- Little or no understanding of software development practices.
- Very few test cases are provided. Little or none of the system has been tested.
- Little or no functional test plan has been provided.
- The project does not make sensible use of software development tools and techniques.
- The quality of the report is extremely low.

40-49%

- You have submitted some unit and/or integration tests, containing some bugs.
- Some test cases are provided but they are poorly designed. No edge cases or corner cases are considered.
- Limited (below average) understanding of software development practices.
- You have attempted a functional test plan, but it is limited in scope and not correctly presented.
- Limited software development tools and techniques have been used, but mostly ineffectively.
- You have produced a basic report but it is not well organized and needs more detail.

50-59%

- Unit and integration tests are well implemented and mostly function without error.
- Basic test case design is reasonable but few or edge cases or corner cases are considered.
- Average understanding of software development practices.
- Your functional test plan contains the correct information but is limited in the scope of its tests.
- A range of software development tools and techniques have been used but to limited effect.
- You have produced a report that describes the work in some detail and follows a reasonable structure.

60-69%

- Unit and integration tests are fully implemented and execute properly.
- Well-designed test cases have been provided. Some edge and/or corner cases have been tested.
- Good understanding of software development practices.
- You have provided a generally complete functional test plan that is well presented.
- You have used a range of software development tools and techniques, mostly to good effect.
- Your report is mostly complete, lacking detail in only a few areas. The organization and presentation are good.

70%+

- Unit and integration tests are provided. All execute without error and the structure of the test suites is outstanding.
- The system is exhaustively tested – most or all conceivable cases are tested.

- High-level understanding of software development practices.
- An exhaustive functional test plan has been provided and its presentation is outstanding.
- Your use of software development tools and techniques is to a professional standard.
- You have produced an excellent report that documents the software well, is well written and correctly organized.

General Guidance

Extenuating Circumstances

There may be a time during this module where you experience a serious situation which has a significant impact on your ability to complete the assessments. The definition of these can be found in the University Policy on Extenuating Circumstances here: https://liveplymouthac.sharepoint.com/sites/x70/SitePages/Extenuating-circumstances.aspx

Plagiarism

This is not a collaborative piece of work. It is an individual work assignment and must be all your own work. Any plagiarism will be dealt with using the appropriate process; consult your student handbook if you are unaware of this as it could jeopardize your studies. This link leads you to a comprehensive 6-minute talk by Jason Truscott on how to avoid plagiarism. https://plymouth.cloud.panopto.eu/Panopto/Pages/Viewer.aspx?id=6b1ef663-cf89-4de6-81af-acb6012c74b6

All of your work must be of your own words. You must use references for your sources, however you acquire them. Where you wish to use quotations, these must be a very minor part of your overall work. To copy another person's work is viewed as plagiarism and is not allowed. Any issues of plagiarism and any form of academic dishonesty are treated very seriously. All your work must be your own and other sources must be identified as being theirs, not yours. The copying of another persons' work could result in a penalty being invoked.

Further information on plagiarism policy can be found here:

- Plagiarism: https://www.plymouth.ac.uk/student-life/your-studies/essential-information/regulations/plagiarism
- Examination Offences: https://www.plymouth.ac.uk/student-life/your-studies/essential-information/exams/exam-rules-and-regulations/examination-offences
- Turnitin (http://www.turnitinuk.com/) is an Internet-based 'originality checking tool' which allows documents to be compared with content on the Internet, in journals and in an archive of previously submitted works. It can help to detect unintentional or deliberate plagiarism. It is a formative tool that makes it easy for students to review their citations and referencing as an aid to learning good academic practice. Turnitin produces an 'originality report' to help guide you. To learn more about Turnitin go to: https://guides.turnitin.com/01_Manuals_and_Guides/Student/Student_User_Manual

Turnitin, available here: https://help.turnitin.com/new-links.htm, is an Internet-based 'originality checking tool' which allows documents to be compared with content on the Internet, in journals and in an archive of previously submitted works. It can help to detect unintentional or deliberate plagiarism. It is a formative tool that makes it easy for students to review their citations and referencing as an aid to learning good academic practice. Turnitin produces an 'originality report' to help guide you.

Referencing

The University of Plymouth Library has produced an online support referencing guide which is available here: http://plymouth.libguides.com/referencing. Another recommended referencing resource is “cite them right” which is available here: Cite Them Right - Home (citethemrightonline.com). This an online resource which provides you with specific guidance about how to reference lots of different types of materials.