Assignment Brief: **Comp1421 Foundations of Computing** 2021-22

Assignment 3	Report with individual presentation
Word Limit or equivalent (e.g. time)	1000 words and 10 minutes You may gain full marks on 1000 words, but there is no penalty for exceeding this limit.
Weighting	25%
Learning Outcomes Assessed	3) Design, build and test a computer-based solution 4) Explain aspects of computer hardware
Submission date	Report: Friday 11th March 2022 Individual Presentation: To be arranged.
Feedback date	All assignment feedback will be issued on the 20th working day following the submission deadline. Feedback will be released on: Friday 8th April 2022
Module Leader	Dr. Colin Price c.price@worc.ac.uk
Verified by	Dr. Chris Bowers

If anything about this assignment is not clear to you, please contact your module leader.

What do I need to do to make a success of this assignment?	This assignment consists of two parts: 1. A Group assignment to design, build and test a robot. (70%) 2. An individual presentation about CPU functioning (30%) -- **Part 1.** -- You will work in groups, a collection of between 3 and 5 individuals. You will organise yourselves into groups. Any loose ends will be assigned by your tutor. **Your group task is to design and construct a robot to solve a task.** A selection of tasks will be announced by your tutor. You will be provided with some basic electronic components: i) Arduino ii) Stepper motors, motor drivers and wheels iii) Either a line-following sensor or an object detection sensor or both iv) Connecting wires, LEDs, resistors v) Limited supply of 3mm MDF You will have access to a 3D-printer and (via your tutor) to a laser-cutter. There will be some hand-tools available (vice, saw, screw drivers and pliers, small electric drill). You will receive instruction before using any of these (Health and Safety considerations). Here is a typical workflow: 1) You will start with a pencil-and paper design (or several designs) which you will evaluate in your group and choose a final design. 2) You will use CAD software to prepare files ready for the laser-cutter and/or 2D printer. Laser-cut parts will be manufactured for you (Health and Safety considerations), but you may 3D print any parts yourself (following instruction). 3) You will assemble the parts into a robot 4) You will write code to solve a task. Your tutor will provide a suitable Arduino-based API or code templates. 5) You will debug your code 6) You will create a testing strategy and test your robot against this. While you will be working in groups, and you may share code, movies of your robot working, screenshots, circuit diagrams and include these in your report, your report must be **individual.** See below how to structure your report. Please consult the assessment matrix. -- **Part 2.** -- You will make a 10-minute presentation on one of the following topics 1) How the Fetch-Execute cycle works 2) How Pipelining works.

| **How should I present my work?** | -------------------------------------- **Part 1.** --

Your report should be structured as follows. **Remember you may share images, diagrams, code, movies,** but all the text in your report must be individually yours.

1) Introduction with module name and code, your student number, the assignment title and the date. **Include the student numbers of all those in your group.**
2) The body of your report will contain
    1. Design documentation. This may include initial pencil-and-paper sketches, CAD drawings, photos of build stages.
    2. Annotated code with a goal hierarchy, evidence of data flow and control flow. You may choose to include a flow-chart or Finite State Machine diagram if appropriate.
    3. Discussion of how the code and physical robot work together (e.g., how sensor input is gleaned, how the motors are driven, and the 'controller' that links the two.
    4. Formulation of a testing strategy
    5. Results of the testing. This may include short movie-clips linked to your report.
    6. Some information about your final build. This would normally consist of photos.

3) You should upload a movie of your robot working to a drop-box provided on Blackbeard.

-------------------------------------- **Part 1.** --

Your presentation should be *interactive* in that you will be expected to have conversation with your audience. You could do this by effectively taking on the role of your tutor.

Specific tips and techniques on crafting an interactive presentation will be discussed in the **briefing session w/c 21st February 2022**.

References (use the University Harvard referencing system, support is available through the library www.worc.ac.uk/library/guides/study-skills/referencing) |

| **How can I obtain guidance on my assignment?** | You can submit an assessment plan of your work in progress or a short piece of text (no longer than one side of A4) to enable you to obtain guidance on the overall structure and direction of your assignment. You should submit this no later than one week before the submission deadline to enable you to review and address feedback provided to develop your work.

Guidance for this assignment will be given during w/c 20 Sept 2021 and w/c 8 November 2021. |

How and when do I hand my assignment in?	Your work must be word-processed/typed and should clearly show your student number. You should submit your work by the 3pm deadline on Friday 3rd December 2021. You should submit your work to a drop-box in Blackboard which is available via MyDay. You are also required to submit your code and log files to the separate drop-box in Blackbeard. **You are required to keep a copy of work handed in**. See the University's guide to uploading and submitting assessment items via Blackboard: https://help.blackboard.com/Learn/Student If you have issues with Blackboard, Turnitin or PebblePad you will need to contact tel@worc.ac.uk

How will my assignment be marked?	Specific marking criteria for your assignment is provided in the Grading Matrix within this document. You are strongly advised to check your completed work against the Grading Matrix to ensure have completed all areas required before you submit it. You should also ensure you adhere to the word limit / word count stated in your assessment brief document, details of which can be found in the University's Assessment Policy http://www.worc.ac.uk/aqu/documents/AssessmentPolicy.pdf

Grading Matrix for Comp1421 Foundations of Computing
This matrix captures the assessment criteria for this part of the coursework.

Student Number/Name:		Academic Year and Semester:	2021-22 AS	3) Design, build and test a computer-based solution
Module Code:	Comp1421	Assignment No/Weighting:	Assignment 3 30%	4) Explain aspects of computer hardware
Module Title:	Foundations of Computing	Assessment Title:	Report and individual presentation	

Assessment Criteria. Part 1 The Report

To understand this matrix, start by reading the baseline grade-C descriptor.

	Knowledge and Understanding			Autonomy in Learning
Grade	Annotated Code	Explanation	Robot Test	Robot Design and Build
%	20	20	30	30
A	Annotated code is both comprehensive **AND** detailed.	Explanation is comprehensive **AND** detailed.	Comprehensive testing strategy with results and clear conclusions and recommendations for further development	Comprehensive **AND** detailed design presented, **and** evidence of a functional build to a high standard
B	Comprehensive **OR** detailed annotated code.	Explanation is comprehensive **OR** detailed.	Testing strategy is comprehensive, and results presented with conclusions.	Comprehensive **OR** detailed design presented, **and** evidence of a functional build
C	Annotated Code correct, including details of *flow* and *goals*.	Explanation of how the code is related to the physical behaviour of the robot.	Testing strategy formulated and results presented.	Straightforward design presented and evidence of a functional build
D	Annotate code correct, but flow **OR** *goals* is missing.	Explanation mostly correct, though may contain some errors.	Attempt at a testing strategy with some results presented.	Design presented, though may lack

				AND/OR partially functioning build
E	Annotate code correct, but flow **AND** *goals* is missing.	Explanation present but contains many errors.	Attempt at formulating a testing strategy, but few results presented.	Attempt at design presented **AND/OR** attempt at build presented with no functionality
F	Annotated code is mainly incorrect, *flow* **AND** *goals* is missing.	Presented text reads more like a discussion than an explanation **AND/OR** there is no link to robot behaviour.	Strategy is in-appropriate or no results presented.	Demonstration of some understanding of the design process. Design has serious flaws.
G	Attempt to annotate code but it is incorrect and inadequate.	There is no explanation; text presented is in the form of a discussion.	Demonstration of some understanding of what testing means.	Demonstration of some understanding of the design process, but no design present.
H	No demonstration of being able to annotate code.	No demonstration of understanding how code is related to the robot behaviour.	No demonstration of understanding what testing means.	No demonstration of the design process.

Comp1421_Assignment_3.docx

Assessment Criteria Part 2 The Presentation

To understand this matrix, start by reading the baseline grade-C descriptor.

	Communication
Grade	**Interactive Presentation**
%	
A	The conversation is informative and interactive and shows shared thinking **AND** exploratory talk.
B	The conversation is informative and interactive and shows shared thinking **OR** exploratory talk.
C	Informative conversation which has interaction with the audience
D	Informative conversation which is partially interactive.
E	Presentation lacks information **OR** interaction.
F	Presentation lacks information **AND** interaction.
G	Attempt to deliver a presentation, though it fails.
H	No demonstration of understanding how to deliver a presentation.

University
of Worcester

Feedback on your assignment.

Please review this feedback and use it to develop your work in your next assignment in this and your other modules. If anything is unclear, please ask the marker.

Aspects done well and why:
- X   - X   - X
Aspects for improvement and why:
- X   - X   - X
Development for future assignments:
- X   - X   - X
How successful completion of this assignment helps your employability and achievement of graduate attributes:

Grade awarded:		**Marker:**		**Moderator*:**	

* This person is responsible for moderating a sample of student work for this module. Your work may, or may not, have been included in this sample.

□ I do not want my work to be used anonymously to help future students

RESULTS ARE PROVISIONAL UNTIL AGREED BY THE BOARD OF EXAMINERS