PRIFYSGOL CYMRU
Y Drindod Dewi Sant
UNIVERSITY OF WALES
Trinity Saint David

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ASSIGNMENT INTERNAL VERIFICATION FORM

ASSIGNMENT TITLE:	Finite State Machines	**LEVEL:**	5
MODULE :	PSDE 5006 – Electronics II	**ASSIGNMENT NO (x of y):**	2 of 2
PROGRAMME:	HNC Electrical and Electronic Engineering	**ASSIGNMENT AUTHOR :**	M Hall

VERSION:	DATE SUBMITTED FOR VERIFICATION :	INTERNAL VERIFIER COMMENTS (Approval or detail of amendments required):	DATE
1.	31/10/2016	Internal verifier W. McIntyre Section 8 should be Section 6 on page 7	02/11/16
2.	09/11/16	Conforms to the assessment pattern described in the module syllabus Tests the module learning outcomes appropriately	09/11/16

INTERNAL VERIFIER PLEASE TICK TO INDICATE THAT THE COURSEWORK:	
√	**Conforms to the assessment pattern described in the module syllabus**
√	**Tests the module learning outcome(s) appropriately**

SIGNATURES OF FINAL APPROVAL:	SIGNATURE	DATE
INTERNAL VERIFIER: I confirm that this version of the assignment specification is ready to be sent to the external examiner		09/11/16
ASSIGNMENT AUTHOR: I confirm that internal verifier and external examiner approval have been received and that this version of the assignment specification will be distributed to students		

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LEVEL/ LEFEL 5

SEMESTER 2

MODULE CODE/ COD Y MODIWL: PSDE 5006
Electronics II

ASSESSMENT TYPE/ MATH O ASESU: ASSIGNMENT

ASSESSMENT/COMPONENT/ ASESIAD/CYDRAN: 2

COMPONENT WEIGHTING/ PWYSAU'R CYDRAN: 25 %

WORD COUNT (or WORD COUNT EQUIVALENT)/ NIFER Y GEIRIAU:
2000 - 2500 WORDS/O EIRIAU

MODULE TUTOR / TIWTOR Y MODIWL: M Hall

SUBMISSION DETAILS/ MANYLION CYFLWYNO:

- **Make sure that Your Name , Your Student P Number, Your Module Title, Assignment Title and Your Module Lecturer's Name are clearly shown on the front page of your assignment**
- **All assignments must be submitted electronically to Turnitin unless indicated by the module lecturer here: ……...**
- **If lecturer additionally requires you to upload coding separately to Moodle it will be indicated here: …NO……..….**
- **If a paper submission is required then it will be indicated here: …YES…… you will then be required to submit the assignment parts in a suitable report folder– not in poly-pockets - to the library. For paper submissions only this form (ALL PAGES) MUST be printed out, signed, attached to the front of your assignment and submitted to the library separately from your electronic assignment submission. Paper submission assignments will not be accepted without this form as it is a requirement that you sign the disclosure regarding the referencing convention.**
- **DO NOT put this form into Turnitin or it will match many similarities with other students' submissions.**

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RESULT

ASSIGNMENT SPECIFICATION

Student name:		**Student P number:**	
Programme:	**HNC Electrical and Electronic Engineering**		
Lecturer:	**M Hall**	**Internal Verifier:**	**W McIntyre**
Assignment Title:	**Finite State Machines**		
Hand Out Date:		**Submission deadline:**	

Referencing:	In the main body of your submission you must give credit to authors on whose research your work is based. Append to your submission a reference list that indicates the books, articles, etc. that you have read or quoted in order to complete this assignment (e.g. for books: surname of author and initials, year of publication, title of book, edition, publisher: place of publication).		
Disclosure:	I declare that this assignment is all my own work and that I have acknowledged all materials used from the published or unpublished works of other people. All references have been duly cited.		
Student's Signature:	*Hardcopy assignments will not be accepted without a signature here*	**Date:**	

Late submission will result in a late penalty mark, as follows:
Up to one week late, maximum mark of 40% for first attempts. No late submission for resit work.
(Academic Quality Handbook 2016/17 7.5 (5))
Only the Extenuating Circumstances Committee may grant an extension.

Learning Outcomes tested (from module syllabus)
Design a test/ measurement procedure to verify circuit/ system operation against a technical specification and apply a range of established test and measurement techniques to verify electronic circuit operation.
Apply the theory involved in designing digital and analogue electronic circuits for specified control processes and adapting designs to meet new purposes or applications. *(Only digital circuits are assessed by the assignment.)*

TASK DESCRIPTION

Preliminary Research

Carry out preliminary research on the various methods of implementing finite state machines. You should carry out a comparison of Moore and Mealy machines, state reduction techniques and the use of different flip-flop types within state machine design.

Task 1

Design, test and evaluate a circuit using the principles of finite state machines (FSM) that will control a pelican crossing. Your design should include the lights controlling the traffic, lights controlling the pedestrians, the 'WAIT' button pedestrians' press and the audible beeper. Your design should be fully automatic and run from an internal clock with internal timers that should also be designed using FSM principles.

- Produce a system specification detailing how the system will work; this should include when each light should change, any timing requirements and the clock frequency. Justify your design choices.
- Plan your overall design in terms of the sub-circuits required and draw a system block diagram
- Draw state diagrams for each sub-circuit
- Decide on an appropriate flip-flop, justify this choice and compile a state transition table for each circuit
- Produce simplified next state and output equations using appropriate techniques
- Simulate and test each sub-circuit separately using MultiSim
- Build and test one of the sub-circuits on breadboard; compare, contrast and critically evaluate the theoretical, simulated and practical results
- Devise a test schedule that will test the overall system for correct operation with respect to the specification

Task 2

In theory, adapt the design to behave as a controller for a puffin crossing. Specifically, this has an additional input from a sensor that detects pedestrian activity and interrupts the sequence to allow traffic flow should no pedestrian be detected. It is not necessary to simulate this circuit, but the design process must be fully explained.

GUIDANCE FOR STUDENTS IN THE COMPLETION OF TASKS

Requirements

- ✓ You are required to present an electronic report containing detailed observational notes of your work. This report must be between 2000 and 2500 words and should be laid out in the following sections preceded by a title page and a table of contents:-

    1. Introduction (set out the aims and objectives)
    2. Research
    3. Design method
    4. Analysis of results
    5. Conclusions
    6. Reference list and bibliography
    7. Annexe for diagrams, data sheets, results tables etc

- ✓ You are expected to present a detailed critical analysis of all your observations and designs

- ✓ You must include citations for all sources

- ✓ Your design and analytical skills need to be evident in both the practical work and the written work

1. Research Informed Literature (10%)

Marks will be awarded according to the extent of research and/or own reading, the selection of credible sources and the application of appropriate referencing conventions.

2. Knowledge and Understanding of subject (30%)

Marks will be awarded according to the extent of knowledge and understanding demonstrated of the concepts and underlying principles associated with the discipline.

3. Analysis (20%)

Marks will be awarded according to the depth and detail of the analysis, evaluation and synthesis. You should demonstrate skills in logical argument, analytical reflection and the organisation of ideas.

4. Practical Application and Deployment (30%)

Marks will be awarded for the effective deployment of appropriate methods and techniques. Specifically, the extent of skill demonstrated in the application of concepts and the formulation of innovative and creative solutions to solve problems.

5. Skills for Professional Practice (10%)

Marks will be awarded for demonstrating the attributes expected in professional practice including:

- Individual initiative and collaborative working
- Deployment of appropriate media to communicate (including written and oral)
- Clarity and effectiveness in presentation and organisation

MARKING CRITERIA AND STUDENT FEEDBACK

This section details the assessment criteria. The *extent* to which these are demonstrated by you determines your mark. The marks available for each criterion are shown. Lecturers will use the space provided to comment on the achievement of the task(s), including those areas in which you have performed well and areas that would benefit from development/improvement.

Common Assessment Criteria Applied	**Marks available**	**Marks awarded**
1. Research-informed Literature Extent of research and/or own reading, selection of credible sources, application of appropriate referencing conventions.	10	
Section 2 – Depth of research	5	
Section 6 – Credibility of reference list	5	
2. Knowledge and Understanding of Subject Extent of knowledge and understanding of concepts and underlying principles associated with the discipline.	30	
Section 2 - Understanding of subject from research	10	
Section 3 – Explanation of the design process and accuracy of the calculations	10	
Section 4 – Use of knowledge to improve the design	10	
3. Analysis Analysis, evaluation and synthesis; logic, argument and judgement; analytical reflection; organisation of ideas and evidence	20	
Section 3 and 5 – Justification of arbitrary decisions in the design process	8	
Section 5 – Presentation and accuracy of results	12	
4. Practical Application and Deployment Deployment of methods, materials, tools and techniques; application of concepts; formulation of innovative and creative solutions to solve problems.	30	
Section 3 - Use of software simulation for designing and testing each block and the overall system	20	
Section 4 - Use of appropriate test equipment for testing all circuits and improving the design	10	
5. Skills for Professional Practice Attributes in professional practice: individual and collaborative working; deployment of appropriate media; presentation and organisation.	10	
Section 1 – Aims and objectives were met	3	
All sections – Clarity and quality of the report	7	

Assignment Mark (Assessment marks are subject to ratification at the Exam Board. These comments and marks are to give feedback on module work and are for guidance only until they are confirmed.)	**Late Submission Penalties (tick if appropriate)**		**%**
	Up to one week late		
	1st/2nd/3rd attempt?	1st	

FdSc & HN COMMON ASSESSMENT AND MARKING CRITERIA

Assessment Criteria	OUTRIGHT FAIL REFER (equivalent to 0-29%	UNSATISFACTORY REFER (equivalent to 30-39%*	SATISFACTORY PASS (equivalent to 40-49%)	GOOD PASS (equivalent to 50-59%)	VERY GOOD MERIT (equivalent to 60-69%	EXCELLENT DISTINCTION (equivalent to 70-79%	EXCEPTIONAL DISTINCTION (equivalent to 80-100%
1. Research-informed Literature Extent of research and/or own reading, selection of credible sources, application of appropriate referencing conventions	Little or no evidence of reading. Views and findings unsupported and non-authoritative. Referencing conventions largely ignored.	Poor evidence of reading and/or of reliance on inappropriate sources, and/or indiscriminate use of sources. Referencing conventions used inconsistently.	References to a limited range of mostly relevant sources. Some omissions and minor errors. Referencing conventions evident though not always applied consistently.	Inclusion of a range of research-informed literature, including sources retrieved independently. Referencing conventions mostly consistently applied.	Inclusion of a wide range of research-informed literature, including sources retrieved independently. Selection of relevant and credible sources. Very good use of referencing conventions, consistently applied.	A comprehensive range of research informed literature embedded in the work. Excellent selection of relevant and credible sources. High-level referencing skills, consistently applied.	Outstanding knowledge of research-informed literature embedded in the work. Outstanding selection of relevant and credible sources. High-level referencing skills consistently and professionally applied.
2. Knowledge and Understanding of Subject Extent of knowledge and understanding of concepts and underlying principles associated with the discipline.	Major gaps in knowledge and understanding of material at this level. Substantial inaccuracies.	Gaps in knowledge, with only superficial understanding. Some significant inaccuracies.	Evidence of basic knowledge and understanding of the relevant concepts and underlying principles.	Knowledge is accurate with a good understanding of the field of study.	Knowledge is extensive. Exhibits understanding of the breadth and depth of established views.	Excellent knowledge and understanding of the main concepts and key theories. Clear awareness of challenges to established views and the limitations of the knowledge base.	Highly detailed knowledge and understanding of the main theories/concepts, and a critical awareness of the ambiguities and limitations of knowledge.
3. Analysis Analysis, evaluation and synthesis; logic, argument and judgement; analytical reflection; organisation of ideas and evidence	Unsubstantiated generalisations, made without use of any credible evidence. Lack of logic, leading to unsupportable/ missing conclusions. Lack of any attempt to analyse, synthesise or evaluate.	Some evidence of analytical intellectual skills, but for the most part descriptive. Ideas/findings sometimes illogical and contradictory. Generalised statements made with scant evidence. Conclusions lack relevance.	Evidence of some logical, analytical thinking and some attempts to synthesise, albeit with some weaknesses. Some evidence to support findings/ views, but evidence not consistently interpreted. Some relevant conclusions and recommendations, where relevant	Evidence of some logical, analytical thinking and synthesis. Can analyse new and/or abstract data and situations without guidance. An emerging awareness of different stances and ability to use evidence to support the argument. Valid conclusions and recommendations, where relevant	Sound, logical, analytical thinking; synthesis and evaluation. Ability to devise and sustain persuasive arguments, and to review the reliability, validity & significance of evidence. Ability to communicate ideas and evidence accurately and convincingly. Sound, convincing conclusions / recommendations.	Thoroughly logical work, supported by evaluated evidence. High quality analysis, developed independently or through effective collaboration. Ability to investigate contradictory information and identify reasons for contradictions. Strong, persuasive, conclusions, justifiable recommendations.	Exceptional work; judiciously selected and evaluated evidence. Very high quality analysis, developed independently or through effective collaboration. Ability to investigate contradictory information and identify reasons for contradictions. Highly persuasive conclusions
4. Practical Application and Deployment Effective deployment of appropriate methods, materials, tools and techniques; extent of skill demonstrated in the application of concepts to a variety of processes and/or contexts; formulation of innovative and creative solutions to solve problems.	Limited or no use of methods, materials, tools and/or techniques. Little or no appreciation of the context of the application.	Rudimentary application of methods, materials, tools and/or techniques but without consideration and competence. Flawed appreciation of the context of the application.	An adequate awareness and mostly appropriate application of well-established methods, materials, tools and/or techniques. Basic appreciation of the context of the application.	A good and appropriate application of standard methods, materials, tools and/or techniques. Good appreciation of the context of the application, with some use of examples, where relevant.	A very good application of a range of methods, materials, tools and/or techniques. Very good consideration of the context of the application, with perceptive use of examples, where relevant. Evidence of some innovation and creativity.	An advanced application of a range of methods, materials, tools and/or techniques. The context of the application is well considered, with extensive use of relevant examples. Application and deployment extend beyond established conventions. Innovation and creativity evident throughout.	Outstanding levels of application and deployment skills. Assimilation and development of cutting edge processes and techniques.
5. Skills for Professional Practice Demonstrates attributes expected in professional practice including: individual initiative and collaborative working; deployment of appropriate media to communicate (including written and oral); clarity and effectiveness in presentation and organisation.	Communication media is inappropriate or misapplied. Little or no evidence of autonomy in the completion of tasks. Work is poorly structured and/or largely incoherent.	Media is poorly designed and/or not suitable for the audience. Poor independent or collaborative initiative. Work lacks structure, organisation, and/or coherence	Can communicate in a suitable format but with some room for improvement. Can work as part of a team, but with limited involvement in group activities. Work lacks coherence in places and could be better structured.	Can communicate effectively in a suitable format, but may have minor errors. Can work effectively as part of a team, with clear contribution to group activities. Mostly coherent work and is in a suitable structure.	Can communicate well, confidently and consistently in a suitable format. Can work very well as part of a team, with very good contribution to group activities. Work is coherent and fluent and is well structured and organised.	Can communicate professionally and, confidently in a suitable format. Can work professionally within a team, showing leadership skills as appropriate, managing conflict and meeting obligations. Work is coherent, very fluent and is presented professionally.	Can communicate with an exceptionally high level of professionalism. Can work exceptionally well and professionally within a team, showing advanced leadership skills. Work is exceptionally coherent, very fluent and is presented professionally.

SPECIFIC LEARNING OUTCOMES FOR IENG

This section lists the IEng learning outcomes for full accreditation that are relevant to the assignment. The marks allocated are extracted from the Marking Criterial and Student Feedback form. The grade awarded for the particular LO is also shown. These grades are then transferred onto a 'global' sheet related to each student ensuring all IEng LO's are assessed at least twice across all modules

Code	Learning Outcome	Relevant Tasks in Assignment	Marks available	Marks awarded	Grade awarded
Science & Mathematics					
SM1i	Knowledge and understanding of the scientific principles underpinning relevant current technologies and their evolution.	Section 3	10		
Engineering Analysis					
EA1i	Ability to monitor, interpret and apply the results of analysis and modelling in order to bring about continuous improvement.	Section 4:	10		
EA2i	Ability to apply quantitative methods in order to understand the performance of systems and components.	Section 3:	10		
EA3i	Ability to use the results of engineering analysis to solve engineering problems and to recommend appropriate action	Section 5:	20		
Design					
D3i	Work with information that may be incomplete or uncertain and be aware that this may affect the design.	Sections 3 and 5:	8		
D4i	Apply problem solving skills, technical knowledge and understanding to create or adapt design solutions that are fit for purpose including operation, maintenance, reliability etc.	Section 3:	10		
Economic, Legal, Social, Ethical and Environmental context					
	N/A				
Engineering Practice					
EP2i	Understanding of and ability to use relevant materials, equipment, tools, processes or products.	Sections 3 and 4:	30		
EP3i	Knowledge and understanding of workshop and laboratory practice.	Sections 3 and 4	30		
EP4i	Ability to use and apply information from technical literature.	Section 3	10		
EP5i	Ability to use appropriate codes of practice and industry standards	Section 3:	10		