BIRMINGHAM CITY
University

Coursework Assignment Brief
Assessment - Undergraduate

Academic Year 2024-25

Module Title: Computer Systems			
Module Code: CMP4267			
Assessment Type Coursework	**Level**	**Weighting** 100%	**Word Count/Workload** 2000-2500
Submission Date *Task 1a: w/c 07/10/2024* *Task 1b: w/c 28/10/2024* *Task 2: w/c 11/11/2024* *Task 3: 09/12/2024*	**Submission Time** *Task 1a: In-class* *Task 1b: in-class* *Task 2: In-class* *Task 3: 3 PM*	**Module Leader** Waldo Cervantes	**Time Limit** N/A

Assessment Information	
Assessment Summary (with type)	This assessment is a portfolio of 4 tasks that aims for you to demonstrate your knowledge on computer systems and your ability to design computer-based solutions for a given problem. You will work individually to develop a prototype of a digital device that should address how it helps to address at least one UN sustainability goal. Knowledge learnt will be assessed by means of two multiple-choice quizzes, in person demonstration to validate the work studied and a written article.
Assessment Title	IoT Centred Knowledge Based Article (Portfolio)
Things to include:	(see table below)

Element	Date	Weight
1a – Quiz A	w/c 07/10/2024	10%
1b – Quiz B	w/c 28/10/2024	20%
2 – In-person Demonstration	w/c 11/11/2024	20%
3 – Knowledge Based Article	3:00pm 09/12/2024	50%

Completion of this assessment will address the following learning outcomes:	
1	Identify fundamental principles of computer systems and architecture.
2	Discuss the applications and core security concepts for computer systems.
3	Apply key computer systems knowledge to design digital solutions.

Submission Information

This assessment will be marked anonymously and should show your student number only.

Submit this coursework assessment task via Moodle.

Late Submission

Assessments must be submitted in the format specified in the assessment task, by the deadline and to the submission point published on Moodle. Failure to submit by the published deadline will result in penalties which are set out in Section 6 of the Academic Regulations, available at: https://icity.bcu.ac.uk/Quality-Enhancement-and-Inclusion/Quality-Assurance-and-Enhancement/Academic-Regulations

Word Count

The maximum word count for this module assessment is shown on Page 1. A +10% margin of tolerance is applied, beyond which nothing further will be marked. Marks cannot be awarded for any learning outcomes addressed outside the word count.

The word count refers to everything in the main body of the text (including headings, tables, citations, quotes, lists etc.). Everything before (i.e. abstract, acknowledgements, contents, executive summaries etc.) and after (i.e. references, bibliographies, appendices etc) is **not** included in the word count limit.

Referencing Style

- BCU Harvard

More information on referencing is available here: https://www.bcu.ac.uk/library/services-and-support/referencing

Use of Artificial Intelligence

Whilst AI tools can be helpful in assisting learning, when it comes to assessment, the Academic Misconduct Procedure is clear that this should be a student's own original work and not the work of other people or AI tools.

The Use of AI Tools – Student Guidelines document follows the same guidelines your lecturers use. If you are unsure of whether AI is appropriate within your work, please read the guidelines or ask your lecturer. For advice and guidance around academic writing, please visit the Centre for Academic Success.

Academic Integrity Guidance

Academic integrity is the attitude of approaching your academic work honestly, by completing and submitting your own original work, attributing and acknowledging your sources when necessary. Understanding good academic practice in written and oral work is a key element of academic integrity. It is a positive aspect of joining an academic community, showing familiarity with and acknowledging sources of evidence. The skills you require at higher education may differ from those learned elsewhere such as school or college.

You will be required to follow specific academic conventions which include acknowledging the work of others through appropriate referencing and citation as explicitly as possible. If you include ideas or quotations that have not been appropriately acknowledged, this may be seen as plagiarism which is a form of academic misconduct. If you require support around referencing, please contact the Centre for Academic Success

It is important to recognise that seeking out learning around academic integrity will help reduce the risk of misconduct in your work. Skills such as paraphrasing, referencing and citation are integral to acting with integrity and you can develop and advance these key academic skills through the Centre for Academic Success (CAS).

To learn more about academic integrity and its importance at university, you can access CAS resources on Moodle. Furthermore, you can book on to workshops and request 1-2-1 support around key academic skills.

Academic Misconduct

Academic misconduct is conduct that has or may have the effect of providing you with an unfair advantage by relying on dishonest means to gain advantage and which therefore compromises your academic integrity.

The Academic Misconduct procedure sets out the process we will follow, and the penalties we may apply, in cases where we believe you may have compromised your academic integrity by committing academic misconduct. The Academic Misconduct Procedure and information about academic support is available at: https://icity.bcu.ac.uk/Student-Affairs/Appeals-and-Resolutions/Academic-Misconduct-Procedure

Task: IoT Centred Knowledge Based Article

Style: Development of a Journal Article in formal style using Harvard style referencing (template provided).

Rationale: 1a, 1b, 2 and 3 allow students to demonstrate experience of both hardware and software implementation of basic IOT concepts, learnt during labs sessions and in private study time. The delivery of the article encourages students to read about new trends and the latest developments in preparation for continued academic study. Together, the combination of in-person quizzes, demonstration and Knowledge-Based Article writing encourages students to engage in professional, reflective dialogue with their peers and the course team.

Description:
1a – Quiz A: A short quiz to assess the foundations of basic electronics and circuit operations that demonstrate a computer system. (10%)

1b – Quiz B: Quiz based on a bank of questions reflecting course materials including number systems and operations of combinational logic that can represent the fundamentals of a computer system architecture. (20%)

2 – In-person Demonstration: Demonstrate knowledge of basic IOT and design skills in preparation for the Knowledge-Based article. (20%)

3 – Knowledge Based Article: The article is to be written based on theoretical and practical skills learnt in lab sessions. Theoretical and practical skills include Computer logic, Digital electronics, Computer Hardware and Security. The assessment emphasises the writer's ability to research and reflect on the knowledge acquired during the study of Computer Systems. Research may include reading scientific journals and other relevant literature suggested by lecturers or through personal interest throughout the module. The assessment contains digital problems to solve using logic principles and the ability to translate these into practice through the designing of circuit configuration diagrams and the implementation of software. The problems to be addressed being based on lab exercises which students have completed prior to the assessment exercise. The article component of the assessment is designed to develop critical thinking about skill learnt by bringing together research and practice in a distinctive discussion of how they would lead technological advancements in the future while maintaining digital security. (50%)

Additional information:

CMP4267 Computer Systems
Knowledge-Based Article

This is an individual piece of work submitted through Moodle. The coursework emphasises on your ability to research and reflect on the knowledge acquired during the study of computer systems. It contains digital problems to solve using logic principles and the ability

to translate these into practice through the designing of circuit configuration diagrams and the discussion of applicable components and software. It develops critical thinking by bringing together research and practice in a distinctive discussion of how you would lead technological advancements.

The following provides detailed expectations and guidance on word count and allocated marks.

1. Imagine you have been employed by a technology company known for the digitisation of products and devices to provide real-time connectivity and data transfer. As such, you have been requested to research the up-to-date literature and write a brief review. This review should consist of introducing the current and future transfer. As such, you have been requested to research the up-to-date literature and write a brief review. This review should consist of the following topics:
   - the current and future trends of computing technology
   - Internet of Things as an enabler of digitising the physical world
   - the consideration of modern networking and system security approaches.

   (600 words)
   (Marks: 20)

2. The company now plans to launch its own range of smart devices for the home consumer market. To remain competitive, a range of products that are aligned to the UN's sustainability goals must be considered. Your manager requests you to design and develop one such product for a client. This section of your article focuses on the technical development of the product assigned to you (you will be assigned a product category at random). The client requests that you produce the following:
   - Describe the foundation of your product's system architecture via a logic circuit with its associated truth tables that describe its intended work and its Boolean expression.
   - You should use the techniques introduced and reviewed in class.

   (400 words)
   (Marks: 25)

3. Based on your research and knowledge, in this section you should propose the hardware requirements to implement a solution of the system you designed in **Part 2.** You should use a design package such as Tinkercad, and include a detailed discussion of your allocated product which includes the following:
   - Block diagram demonstrating product operation and sensors integration, and description of the block diagram
   - Schematic of your developed Circuit
   - Codes
   - Results, including explanation of the components used within your circuit and their intended operations

(500 words)
(Marks: 25)

4. The article should end with your own reflection on the following:

    - Draw conclusive recommendations on how you believe the technological competitiveness of Parts 2 and 3 can be further achieved for both the consumer and manufacturer.

    (300 words)
    (Marks: 10)

    - Security considerations relevant to your designs such as communication encryption, firewall configuration and end-user awareness for IOT-style devices.

    (300 words)
    (Marks: 10)

5. The presentation of your Knowledge Article is based on institutional standards recommended by the Institute of Engineering and Technology (IET) or Institute of Electrical and Electronics Engineering (IEEE) and with adherence to Birmingham City University's academic assessment policy and guidance. This part measures your ability to follow instructions and present your work in a professional manner, with clear attention to your writing, structure and ability to reference using the Harvard approach. The following will assist you in accomplishing your article to standard.

    - Use the *'CS Article Template.doc'* which can be found on Moodle to convert and deliver your article in the professional academic format. It is adapted from the IEEE and takes into account the IET requirements.

    (Marks: 10)
    (Total Marks: 100)

For advice on writing style, referencing and academic skills, please make use of the Centre for Academic Success: Centre for Academic Success - student support | Birmingham City University (bcu.ac.uk)

Transferable skills:
Encourages realisation of multi-disciplinary computing, challenges students to interface with the environment by configuring Internet of Things devices and systems for collecting data for the proposed solution. Fosters the ability to respond to a technical brief to find practical solutions to problems; evaluate and respond to the challenges of interdisciplinary approaches; respond flexibly and imaginatively within a fixed timescale.

Marking Criteria:
Table of Assessment Criteria and Associated Grading Criteria

Task 2 – In-person Demonstration (20%)

Learning outcome	**LO1** - Identify fundamental principles of computer systems and architecture.		
Assessment Criteria →	Background research on allocated product.	Research on sustainability goals relevant to product.	Product designs formulated so far.
Weight:	**35%**	**30%**	**35%**
Grading Criteria **0 – 20% Fail**	Unable to discuss background research or demonstrates inaccurate understanding.	Sustainability goals not presented, or very minimal detail provided.	Designs presented are unsuitable for the intended purpose.
21 – 39% Fail	Basic understanding of the allocated product with major deficiencies.	At least one goal is presented with very minimal detail.	Designs contain basic information with no attempt at using visual aids (images or diagrams).
40 – 49%	Allocated product is discussed with some accuracy, but more detail is needed.	Multiple goals relevant to the product are presented with minimal detail.	Designs show evidence of planning beyond a basic outline. Visual aids (images and diagrams) are used but could be improved.
50 – 59%	Multiple features of the product are discussed, but more detail is needed, or one feature is addressed in reasonable detail.	Multiple relevant goals are presented. The linkage between the product and goals is clear but requires more detail.	Designs are well thought out with appropriate visual aids (images and diagrams), though some areas could be improved.
60 – 64%	Multiple product features are addressed in detail, showing some awareness of related issues.	Goals are presented in detail. Research has some impact on the product design.	Designs are well thought out with adequate amount of information. Visual aids (images and diagrams) are used, with minor errors.
65 – 69%	Multiple product features are addressed in detail, showing knowledge of related issues.	Goals are presented in detail, with a clear linkage between the product and goals. Research has a notable impact on the product design.	Designs are well thought out with adequate amount of information. Visual aids (images and diagrams) are used.
70 – 79%	Multiple features are addressed accurately, demonstrating very good knowledge and understanding of related issues.	Goals are presented in detail, with a clear and well-thought-out linkage between the product and goals. Research has a significant impact on product design.	Good designs with effective use of visual aids (images and diagrams).
80 – 89%	Multiple features are presented accurately with cutting-edge knowledge and understanding, showing clear and confident awareness of related issues.	Goals are presented in detail, with a clearly outlined linkage to the product. The research conducted has a significant impact on product design.	Very good designs with excellent use of visual aids (images and diagrams). Designs are well thought out with very little room for improvement.
90 – 100%	Multiple features are addressed accurately, showing a level of knowledge and understanding that exceeds expectations. Demonstrates confident, convincing, and wide-ranging knowledge of related areas.	An excellent choice of goals is presented, with a detailed and clearly outlined linkage to the product. Research is clearly driving the product design.	Outstanding designs with innovative use of visual aids (images and diagrams). Very high attention to detail throughout.

Task 3 – Knowledge Based Article (50%)

Learning outcome	**LO1** - Identify fundamental principles of computer systems and architecture.	**LO2** - Discuss the applications and core security concepts for computer systems.		**LO3** - Apply key computer systems knowledge to design digital solutions.	
Assessment Criteria →	**1. Literature report:** *Topics* - current trends - future trends - IoT digitisation - Modern networking - Security	**2. Technical development for Client:** *Topics* - System architecture - Logic circuit - Truth tables - Boolean expression	**3. Requirements:** *Topics* - Tinkercad circuit (schematic) -Block diagram - Code -Result and discussion	**4. Evaluation:** *Topics* - Technological competitiveness - Security consideration	**5. Article presentation:** - Quality of writing - Article structure - Template
Weight:	**20**	**25**	**25**	**20**	**10**
Grading Criteria 0 – 20% Fail	Literature report not attempted. No topics covered.	Technical challenges for the client not attempted.	No knowledge of requirements demonstrated.	Neither technological nor security considerations provided.	Poor quality writing with no structure.
21 – 39% Fail	At least one topic has been reported but not in detail.	Emerging technical ability. At least one topic has been developed but not in detail.	At least one topic has been documented but not in detail.	Emerging evaluation. At least one topic has been reported but not in detail.	Emerging presentation. Either quality of writing or article structure has been addressed.
40 – 49%	An elementary literature report. At least two topics have been reported with minimum detail.	Two topics have been developed for the client with minimum detail.	Elementary requirements. At least two topics have been documented.	Both topics have been reported to a minimum detail.	Both quality of writing and article structure have been addressed.
50 – 59%	Standard literature report. Three topics have been reported with minimum detail.	Three topics have been developed for the client with minimum detail.	All four topics have been documented, and technical detail has some errors.	Both topics have been reported with adequate detail, with minor deficiencies.	Both quality of writing and article structure have been addressed. The article template has been used.
60 – 64%	Four topics have been reported with an adequate level of detail based on relevant references. Academic referencing used, with minor errors.	Good technical ability. All four topics for the client have been developed.	Good development of requirements. All four topics have been documented in detail with minor technical errors	Both topics have been reported in detail.	Quality of writing and article structure have been addressed to a level 4 standard. The template has been used.

Grade					
65 – 69%	Four topics have been reported in detail. Relevant literature and academic referencing have been utilised throughout.	Good technical ability. All four topics for the client have been developed with adequate level of detail and appear to be correct.	Good requirements. All four topics have been documented in detail, and technical aspects appear to be correct.	Both topics have been reported in detail and critically appraised.	Quality of writing and article structure have been addressed to a level 4 standard. The template has been used and care has been taken to follow formatting guidance.
70 – 79%	A robust literature report. All topics have been reported in detail and clearly referenced using adequate academic literature. Contrasting arguments are introduced.	Robust technical ability. All four topics have been developed in detail and are correct.	All four topics have been documented in detail. Technical aspects are correct.	Robust evaluation. Both topics have been reported in detail as well as critically appraised in detail.	Quality and structure have been addressed in an academic standard. The template has been used, formatting guidance and Harvard referencing have been employed. Individual sections appear appropriately weighted.
80 – 89%	A robust and 'publication ready' literature report. All topics have been reported in detail and clearly referenced using up-to-date and relevant academic literature. Contrasting arguments are developed and alternate solutions are proposed.	Professional technical ability. All four topics have been developed in detail and are correct Justification is provided for logic implemented.	Requirements met to a professional standard. All four topics have been documented in detail. Technical aspects are correct, and the discussion contains contrasting arguments.	Both topics have been reported in detail and critically appraised in detail. Alternative solutions have been suggested.	Quality and structure have been addressed. The template has been used, formatting guidance and Harvard referencing have been employed. Individual sections are appropriately weighted, and the article logically flows. The article is ready to be published.
90 – 100%	An outstanding and 'publication ready' literature report. All topics have been reported in detail and clearly referenced. Contrasting arguments are developed and alternate solutions are proposed based on up-to-date and state of the art literature.	All four topics have been developed in detail and all appear to be correct. Extensive justification is provided for logic implemented. Alternative and appropriate solutions are introduced.	Requirements developed to a professional standard. All four topics have been documented in extensive and adequate detail. Technical aspects are correct and the discussion contains contrasting arguments and novel solutions.	Both topics have been reported in detail and critically appraised. Alternative solutions have been suggested and suitably researched.	Quality and structure have been addressed in a publication-ready standard following the requirements for a high impact journal.

Submission Details:

Format: Upload to Moodle

Regulations:

- The minimum pass mark for a module is 40%
- Re-sit marks are capped at 40%

Full academic regulations are available for download using the link provided above in the IMPORTANT STATEMENTS section

Late Penalties

If you submit an assessment late at the first attempt, then you will be subject to one of the following penalties:

- if the submission is made **between 1 and 24 hours** after the published deadline the original mark awarded will be reduced by **5%**. For example, a mark of 60% will be reduced by 3% so that the mark that the student will receive is 57%.
- if the submission is made between **24 hours** and **one week (5 working days)** after the published deadline the original mark awarded will be reduced by 10%. For example, a mark of 60% will be reduced by 6% so that the mark the student will receive is 54%.
- **if the submission is made after 5 days following the deadline, your work will be deemed as a fail and returned to you unmarked.**

The reduction in the mark will not be applied in the following two cases:

- o the mark is below the pass mark for the assessment. In this case the mark achieved by the student will stand

- o where a deduction will reduce the mark from a pass to a fail. In this case the mark awarded will be the threshold (i.e., 50%)

Please note:
- **If you submit a re-assessment late then it will be deemed as a fail and returned to you unmarked.**

Feedback:

Marks and Feedback on your work will normally be provided within 20 working days of its submission deadline.

Where to get help:

Times of support can be found on Moodle.

Students can get additional support from the library support for searching for information and finding academic sources. See their iCity page for more information: http://libanswers.bcu.ac.uk/

The Centre for Academic Success offers 1:1 advice and feedback on academic writing, referencing, study skills and maths/statistics/computing. See their iCity page for more information: https://icity.bcu.ac.uk/celt/centre-for-academic-success

Additional assignment advice can be found here: https://libguides.bcu.ac.uk/MA

Fit to Submit:

Are you ready to submit your assignment? Review this assignment brief and consider whether you have met the criteria. Use any checklists provided to ensure that you have done everything needed.

Assignment Checklist

Run through this simple tick list before submitting your work!

Report

Well prepared materials make your work look more professional and easier to understand.

Item	Action	Done?
1	I have used the spellchecker and proofread the work correcting errors several times.	
2	I have checked that all material is directly related to the assignment tasks.	
3	I have checked that all the required information has been included in the work.	
4	The work is professionally presented using consistent headings, fonts and layout.	
5	All tables and images are numbered and captioned.	
6	I have used the structure specified in the assignment.	

Referencing and Originality

Your work will be subjected to checks to ensure it is not copied. Derivative work may leave you subject to penalties, including in extreme cases, expulsion from the University.

Item	Action	Done?
1	All images and tables are fully referenced.	
2	I have not copied any material from anywhere else. All sentences have been paraphrased into my own words.	
3	All references appear in the references section at the end of the presentation.	
4	All references are cited in the text in the form of (author, year). See https://www.bcu.ac.uk/library/services-and-support/referencing for more details.	
5	If I have used quotes, these are fully referenced, appear in quotation marks and form only a small part of my work.	

Content

Is your work complete? Have you included all the required elements?

Task and Description
1 - Literature Review *(600 words, 20 marks)*
Identify and summarise current computing technology trends
Predict and discuss future computing technology trends
Review what the IoT is and its role in digitalisation
Introduction and discussion on networking and security approaches
Cite all sources using Harvard style
2 - Product Design and Development *(400 words, 25 marks)*
Review and describe you assigned product's functionality
Create truth tables and write Boolean expression based on the functionality
Describe system architecture via logic circuit
Create truth tables and write Boolean expression
Cite all sources using Harvard style
3 - Hardware Requirements and Circuit Design *(500 words, 25 marks)*
Create block diagram demonstrating operation and sensors integration
List and explain components used in the circuit
Develop and include circuit schematic (Tinkercad)
Provide codes and present implementation results
Cite all sources using Harvard style
4 - Conclusion and Security Considerations *(600 words, 20 marks)*
Draw recommendations for enhancing technological competitiveness for consumer and manufacturer
Discuss encryption, firewall configuration, and user awareness
Cite all sources using Harvard style
5 - Presentation and Formatting *(10 marks)*
Download and use 'CS Article Template.doc' from Moodle
Ensure article meets IET/IEEE standards
Ensure clear writing, logical structure, and professional presentation
Use Harvard referencing style consistently