**description of cOURSEWORK**

**OFFICE OF ACADEMIC AFFAIRS**

Reference No. : XMUM.OAA - 100/2/8-V3.0

Effective Date : 1 JUNE 2023



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| --- | --- |
| Course Code | CST 205 |
| Course Name | Digital Logic |
| Lecturer | Mohammad Arif Sobhan Bhuiyan |
| Academic Session | 2023/09 |
| Assessment Title | Lab report |

1. **Introduction/ Situation/ Background Information**

Digital logic or digital (electronic) circuits are electronics that operate on digital signals. In contrast, analog circuits manipulate analog signals whose performance is more subject to manufacturing tolerance, signal attenuation and noise. Digital techniques are helpful because it is a lot easier to get an electronic device to switch into one of a number of known states than to accurately reproduce a continuous range of values. All the logical problems can be solved by digital circuits including, adder, decode, encoder, multiplexer, demultiplexer, comparator, shift register, counters etc.

1. **Course Learning Outcomes (CLO) covered**

At the end of this assessment, students are able to:

CLO 3 **Propose solutions to fail safe digital circuits via leading a group work. (A5, PLO8).**

CLO 4 **Design and develop digital logic circuits. (P7, PLO3).**

CLO 5 **Propose solution to address energy consumption issues in digital circuits (A5, PLO11)**

1. **University Policy on Academic Misconduct**
2. Academic misconduct is a serious offense in Xiamen University Malaysia. It can be defined as any of the following:
3. **Plagiarism** is submitting or presenting someone else’s work, words, ideas, data or information as your own intentionally or unintentionally. This includes incorporating published and unpublished material, whether in manuscript, printed or electronic form into your work without acknowledging the source (the person and the work).
4. **Collusion** is two or more people collaborating on a piece of work (in part or whole) which is intended to be wholly individual and passed it off as own individual work.
5. **Cheating** is an act of dishonesty or fraud in order to gain an unfair advantage in an assessment. This includes using or attempting to use, or assisting another to use materials that are prohibited or inappropriate, commissioning work from a third party, falsifying data, or breaching any examination rules.
6. All assessments submitted must be the student’s own work, without any materials generated by AI tools, including direct copying and pasting of text or paraphrasing. Any form of academic misconduct, including using prohibited materials or inappropriate assistance, is a serious offense and will result in a zero mark for the entire assessment or part of it. If there is more than one guilty party, such as in case of collusion, all parties involved will receive the same penalty.
7. **Instruction to Students**

You are required to **answer all the assignment questions**. This is a 4-person group assignment. You are required to prepare **one pdf softcopy** of a **report** detailing the answers for the assignment questions **(no more than total 16 pages; cover page, rubrics page etc. are excluded)**. Your submission report file need a cover page, report 1, report 2 and rubrics pages merged together. The pdf softcopy (**named with your student IDs separated by ( \_ )**) of the report should be uploaded in the moodle assignment latest by **05th January, 2024 (Friday)** by a member from a group **(multiple submission from a group is strictly prohibited).** Besides you also need to prepare a group presentation (using power point slides) explaining your lab 1 and lab 2 approximately for 5 minutes. The ppt/pptx file should be uploaded in the one drive link: ([Presentation submission folder CST 205 23\_09](https://xmueducn-my.sharepoint.com/:f:/g/personal/arifsobhan_bhuiyan_xmu_edu_my/Elgt9lNS8uBHkArsj7CSbUEBgIl2MnqVpxM4W9X-rCjvUA?e=LmXyiC)).The deadline of this assignment is on **05th January, 2024 (Friday)**. In case you cannot submit on time, you can email me ([arifsobhan.bhuiyan@xmu.edu.my](mailto:arifsobhan.bhuiyan@xmu.edu.my)) and set the email subject as: “**CST 205 lab report 2023/09**”. There will be a mark deduction on the report **(-10 marks)** and presentation **(-2 marks)**.

1. **Evaluation Breakdown**

|  |  |  |
| --- | --- | --- |
| **No.** | **Component Title** | **Percentage (%)** |
|  | **Design and Implementation of a 3 bit comparator.** | 15 |
|  | **Design and implementation of an asynchronous MOD-60 counter** | 15 |
|  | **TOTAL** | **30** |

|  |  |  |
| --- | --- | --- |
| **No.** | **Component Title** | **Percentage (%)** |
|  | **A 5-minutes presentation explaining your design procedure for lab 1 and lab 2 for compact design** | 5 |
|  | **TOTAL** | **5** |

1. **Task(s)**

Design the circuit and measure the performance of the circuit. You must not use components like adder, comparators, counter etc. Instead you **should use basic logic gates and flip flops only** for your circuit design and analysis. Write down the following in the report for each experiment:

1. Title and objectives. [1m] the title is already given in the assignment
2. Theory. [4m] Theory must include detail circuit design and analysis.
3. List of apparatus/components. [1m] List down the components you need.
4. Results. [3m] put the screenshot of the simulation results and relevant explanation.
5. Discussions and comments. [6m] if there any design/simulation/result issue you want to discuss.
6. Your logisim simulation file (.circ) working properly (if any)

Here, you can add screenshots/photos of the results if necessary. You should submit:

1. **pdf report file named with your ids.**
2. **A zip/rar file (named with your ids)** containing two simulation file named as lab 1 and lab 2 (if any).
3. **A presentation (preferably in ppt/pptx format) file (named with your id(s))**

You can use any standard font, size, line space to make your report readable and attractive. Try to avoid red color.

**APPENDIX 1**

**Marking Rubrics**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Component Title** | **Digital Logic (comparator)** | | | | | **Percentage (%)** | **15%** | |
| **Criteria** | **Score and Descriptors** | | | | | | **Weight (%)** | **Marks** |
| **Excellent**  **(5)** | **Good**  **(4)** | **Average**  **(3)** | **Need Improvement**  **(2)** | **Poor**  **(1)** | |
| **a (CLO 4)** | The title & objectives of the experiment are excellent identified and well stated. | The title & objectives of the experiment are clearly identified and well stated. | The title & objectives of the experiment are mostly identified. | The title & objectives of the experiment are partially identified or vague. | The title & objectives of the experiment are erroneous or irrelevant. | | **0.2** |  |
| **b(CLO 4)** | Introduction is complete and well written; provides all necessary background principles for the experiment | Introduction is nearly complete, missing some minor points | Some introductory information, but still missing some major points | Very little background information provided | Wrong information provided and not related to the experiment topic. | | **0.8** |  |
| **c(CLO 4)** | All the equipment & components are listed and described with sufficient details | All the equipment & components are listed and described with nearly sufficient details | All the equipment & components are listed and described with some details | All the equipment & components are listed with no details | Wrong or incomplete list of equipment & components | | **0.2** |  |
| **d(CLO 4)** | All figures, graphs, tables are correctly drawn, are numbered and contain titles/captions. All important calculation steps (if any) have been included and  accurately presented. | All figures, graphs, tables are correctly drawn, but some have minor problems or could still be improved. All-important calculation steps (if any) are included but minors error is present. | Most figures, graphs, tables are correctly drawn, some still missing some important or required features. Some important calculation steps (if any) are missing. | Figures, graphs, tables contain errors or are poorly constructed, have missing titles, captions or numbers, units missing or incorrect, etc. Important calculation steps (if any) are missing. | All figures, measured data, calculations, and graphs/plots are incorrect. | | **0.6** |  |
| **e, f (CLO 4)** | All-important trends and data comparisons have been interpreted correctly and discussed, good understanding of  results is conveyed | Almost all of the results have been correctly interpreted and discussed, only minor improvements are needed | Some of the results have been correctly interpreted and discussed; partial but incomplete understanding of results is still  evident | Very incomplete or incorrect interpretation of trends and comparison of data indicating a lack of understanding of results. | Experiments not completed. Discussion shows wrong understanding of what the experiment is all about. | | **1.2** |  |
| **TOTAL** | | | | | | | **3** |  |
| **Component Title** | **Digital Logic (counter)** | | | | | **Percentage (%)** | **15%** | |
| **Criteria** | **Score and Descriptors** | | | | | | **Weight (%)** | **Marks** |
| **Excellent**  **(5)** | **Good**  **(4)** | **Average**  **(3)** | **Need Improvement**  **(2)** | **Poor**  **(1)** | |
| **a (CLO 4)** | The title & objectives of the experiment are excellent identified and well stated. | The title & objectives of the experiment are clearly identified and well stated. | The title & objectives of the experiment are mostly identified. | The title & objectives of the experiment are partially identified or vague. | The title & objectives of the experiment are erroneous or irrelevant. | | **0.2** |  |
| **b(CLO 4)** | Introduction is complete and well written; provides all necessary background principles for the experiment | Introduction is nearly complete, missing some minor points | Some introductory information, but still missing some major points | Very little background information provided | Wrong information provided and not related to the experiment topic. | | **0.8** |  |
| **c(CLO 4)** | All the equipment & components are listed and described with sufficient details | All the equipment & components are listed and described with nearly sufficient details | All the equipment & components are listed and described with some details | All the equipment & components are listed with no details | Wrong or incomplete list of equipment & components | | **0.2** |  |
| **d(CLO 4)** | All figures, graphs, tables are correctly drawn, are numbered and contain titles/captions. All-important calculation steps (if any) have been included and  accurately presented. | All figures, graphs, tables are correctly drawn, but some have minor problems or could still be improved. All-important calculation steps (if any) are included but minors error is present. | Most figures, graphs, tables are correctly drawn, some still missing some important or required features. Some important calculation steps (if any) are missing. | Figures, graphs, tables contain errors or are poorly constructed, have missing titles, captions or numbers, units missing or incorrect, etc. Important calculation steps (if any) are missing. | All figures, measured data, calculations, and graphs/plots are incorrect. | | **0.6** |  |
| **e, f (CLO 4)** | All-important trends and data comparisons have been interpreted correctly and discussed, good understanding of  results is conveyed | Almost all of the results have been correctly interpreted and discussed, only minor improvements are needed | Some of the results have been correctly interpreted and discussed; partial but incomplete understanding of results is still  evident | Very incomplete or incorrect interpretation of trends and comparison of data indicating a lack of understanding of results. | Experiments not completed. Discussion shows wrong understanding of what the experiment is all about. | | **1.2** |  |
| **TOTAL** | | | | | | | **3** |  |
|  | | | | | | | | |
| **Component Title** | **Digital Logic (Presentation and team work)** | | | | | **Percentage (%)** | **5%** | |
| **Criteria** | **Score and Descriptors** | | | | | | **Weight (%)** | **Marks** |
| **Excellent**  **(5)** | **Good**  **(4)** | **Average**  **(3)** | **Need Improvement**  **(2)** | **Poor**  **(1)** | |
| **Presentation of the topic (CLO5)** | Topic is presented very clearly and interestingly, discussion from compactness and energy efficiency perspectives with sufficient explanation. | Topic is presented very clearly and interestingly, average discussion. | Topic is presented nearly clearly and average discussion. | Uninteresting presentation and discussion on the topic. | No presentation | | **0.6** |  |
| **Group work**  **(CLO 3)** | Excellent contribution from everyone to complete the assignment | Satisfactory contribution from everyone to complete the assignment | Some contribution from everyone to complete the assignment | Very little contribution from everyone to complete the assignment | No team contribution | | **0.4** |  |
| **TOTAL** | | | | | | | **1** |  |

Note to students: Please include the marking rubrics when submitting your coursework.