

COMP 228 : Systems Hardware

Fall 21

Due date: 11:59 pm, Dec-052021

As a System Engineer you were asked to design software/ hardware system to transmit series of bytes through a communication channel and the data is transmitted one byte at a time.

However, the data could be corrupted along the communication path before it is processed by the receiver. In this project you will design a system to transmit the data along with error detection and correction bits. Your design must allow the receiver to detect and correct single bit errors.

The project is of three parts:

Part I: Design

The overall design of the transmission system such as the derivation of parity bits, total number of bits to be transmitted etc.

Part II: Software Implantation

Implement the transmission using MARIE machine architecture and assembly language.

Review Chapter 4 of text book and see : <https://marie.js.org/> for more information on MARIE.

In this part you must:

- a. Present the assembly code to solve the problem
- b. Sample inputs and outputs with explanation and discussion

Part III: Logic circuit design

Use the concepts learned in the course (see chapter 3) to design a logic circuit to implement the transmitter.

- a. Specify all parameters and assumptions used in design.
- c. Show the logic design of the system
- d. Sample inputs and outputs with explanation and discussion

The is a group project, each group is composed of 2 to 3 students. In all group members must contribute equally to the project. You project will be evaluated as per the following rubric:

| Aspect/level | 1 (failed) | 2 (unsatisfactory) | 3 (meet expectation with restrictions) | 4(meet expectation) | 5 (Exceed expectation) |
|-------------------------|--|--|---|---|---|
| Coding | Code is not readable, not efficient and does not produce any results | The code is poorly organized, and very difficult to read. | It is readable only by someone who knows what it is supposed to be doing. | The code is fairly efficient without sacrificing readability and understanding. It is fairly easy to Read and understand. | Exceptionally well organized and very easy to understand |
| Hardware design | Does not provide any output | Design works but with errors | Design properly implemented but could be improved | Design properly implemented | Exceptionally design |
| Report structure | Not organized and not well written (many grammatical mistakes) | Report is not well organized and not well written. Design and results are presented but with no explanation or discussion. | Report is organized and well written. Design and results are presented but with limited explanation and discussion. | Report is well organized and well written. Design and results are presented with explanation and discussion. | Report is exceptional: very well organized and is very well written. Design and results are presented with full explanation and discussion. |

Report template

For your report use the IEEE template presented in the link:
<https://www.ieee.org/conferences/publishing/templates.html>