

Daffodil International University

**Department of Computer Science and Engineering**

**Faculty of Science & Information Technology**

**Midterm Exam Examination, Fall 2020 @ DIU Blended Learning Center**

**Course Code: CSE423 (Day), Course Title: Software Engineering**

**Level: 4 Term: 2 Section: O-8**

**Instructor: MKR Modality: Open Book Exam**

**Date: Sunday 5 November, 2020 Time: 02:00pm-06:00pm**

 **Four hours (4:00) to support online open/case study based assessment Marks: 25**

**Directions:**

* **Students need to go through the CASE STUDY shown in this exam paper.**
* **Analyze and answer specific section based on your own thinking and work.**
* **Do not share as this will be treated as plagiarism by Blended Learning Center.**
* **Submit the answer scripts in Google Form posted either in your Google Classroom or BLC.**
* **Answer all the questions.**
* **Handwriting should be clear.**
* **Maintain serial in answering the questions. If the answers are not in proper serial, marks shall be deducted.**
* **Marks are highlighted in green color**
1. **Jim is appointed as a Hardware Design Engineer in BMW car manufacturing industry. Jim is responsible for designing a particular reactive system for a proposed autonomous car.**
2. **Why do you think BMW is focusing on research towards reactive systems for the autonomous car? (1.5)**
3. **Jim is confused whether to assemble the system using microprocessors or microcontrollers. Recommend Jim the correct options for this system. State the reason why you think the option you recommended Jim is ideal for the purpose [N.B: Provide all possible justifications based on your considerations] (2.5).**
4. **What are the basic components needed for the architecture design of this system and how do you recommend Jim in designing the hardware and software components? (1.5)**
5. **Kareem is trying built an embedded system as his classroom project. The system automatically increases the brightness of the light bulb within the room based on the sunlight intensity of the day.**
6. **Based on your current understanding write the Arduino code that would autonomously increases and decreases brightness. For better visible understanding make sure that level of brightness is gradually increased. The full brightness is retained for about 10 minutes and the brightness again decreases gradually. (2)**
7. **What could be the challenges Kareem may face while designing this embedded system project? Explain the challenges in your own words (2)**
8. **State the levels of abstractions involved in designing this project and explain each of in one or two sentences using your own words. (3).**
9. **For designing a cheap washing machine Sujon is deeply concerned whether to use microcontroller or microprocessor. Rifat suggested Sujon to use microcontroller for the project.**
10. **Why do you think microcontroller is suitable for this purpose? State your reasons and give appropriate explanation (2.5)**
11. **In order to understand washing machine working properly, Sujon wanted to built a system which blinks an Led constantly when the system is initiated with a button and the blinking of LED stops when the user press the button again. Write the Arduino code for this basic system (2)**
12. **State an example of a possible “Hard Real-time constraint” the system may face (1.5)**
13. **(i). You are asked to design a intruder detection system. Name the hardware (microprocessor or microcontroller) you will use, hardware components needed, the level of abstraction involved in the designing process, any constraints of the system, whether or not any actuators are needed, The idea must be presented in detail based on the knowledge you have gained so far from this course. (4)**

**(ii) You are designing a communication system for the USSR army where messages are transmitted in terms of voice mails. Do you think using closed loop control would be appropriate for this system? Why do you think so ? (2.5)**