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| Announced Date: 13-06-2022 | Due Date: 22-06-2022 | Total Marks = 10(2) |
|  |  | Marks Obtained = |

# Teacher Name: Shiraz Afzal

**Assignment 3 – Complex Engineering Problems**

**EE423—Embedded System Design & Application**

**CLO\_3: (Cognitive Level C6 (Creating), PLO\_3: Design and development of solution)**

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| **Complex Engineering Problem** | | | | | |
| **Sr. No** | **Course**  **Learning Outcomes in** | **Blooms Taxonomy** | **PLOs** | **Knowledg e Profile** | **Complex Problem**  **Solving** |
| CLO\_3 | **Design** an  Embedded system based solution for the engineering problem. | C6 (Creating) | PLO3 (WA3)  Design and development of Solution | WK5  Engineering Design | WP1  (Depth of Knowledge required)  WP3  (Depth of Analysis required) |

# Objective # 1

**Design** a Pepsi vending machine have facility benefits by having a convenient way to purchase Pepsi’s full line of vending machine products. Pepsi’s vending machine that sells cold drink cans that costs a 2$ each. Moreover we have only 3 types of coins: 1$, 2$ and 5$. Determines when to dispense a can, how to return the change.

Note: In this design we will ignore the capacity of the stock, which means, we’ll assume that there will always be can in the vending machine. Also, we can assume that only one action could be made in every “clock cycle” or state

Rules: First give back the change then dispense the can from the machine Provide the solution for given problem

1. Objective is to design a state diagram
2. Design a VHDL code of the state diagram
3. Simulate this code in Xilinx Software and show the timing diagram.

Submit the solution in the form of report (5 -10 pages) that must include:

* 1. Introduction
  2. Literature Review (Discuss at least 3 similar system those are already available
  3. Methodology
  4. Results & Conclusion
  5. References (books/Conferences/Journal Paper Publications with proper citation in text)

# Complex Engineering Problem/Activity:

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| **Complex Engineering Problem Details** | **Included: Yes**  Nature and details of Complex Engineering Problem (CEP): It will be given in Assignment # 03.  CEP will be based on CLO 3 “**Design** an embedded system based solution for the engineering problem”. To solve the problem, students have to use in-depth knowledge related to the following concepts: Finite state machine, moore machine FSM, mealy machine FSM, state diagram and VHDL language  **Attributes could be: WP1, WP3, WP7, WK5, WK8, WA3**  WP1: Depth of knowledge required WP3: Depth of analysis required WK5: Engineering Design  WA3: Design/Development of Solutions Assessment in: Assignment # 03 |
| **Complex Engineering Activity**  **Details** | **Included: Yes** |