The Hong Kong Polytechnic University
Department of Electronic and Information Engineering

A

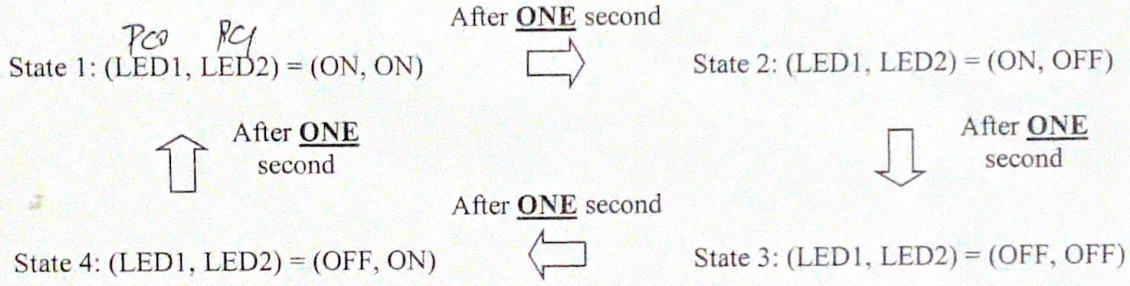
EIE3105 Quiz 1 (Timer/Counter Programming) (60 minutes)

**Instructions:**

1. **You should open a new project for each question. The project name should be Quiz< version no.><question no.>, e.g., Quiz1AQ1.**
2. **At the beginning of your program file, you have to add a comment to show your student name and identity number, e.g., // Chan Tai Man, 01234567D.**
3. **This quiz carries four marks.**

**Question 1 (2 marks)**

Build a hardware circuit and write a C program to complete the following task: Connect two **RED** LEDs (say LED1 and LED2) and one button to your Arduino UNO. At the beginning, these two LEDs are in State 1 (see the diagram below). When the button is pressed, these two LEDs change their states according to the diagram below. Note that you must use the timer programming in the implementation.

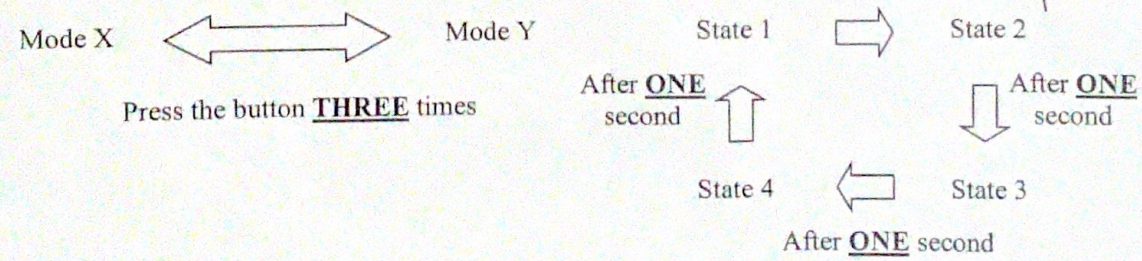



**Question 2 (2 marks)**

Build a hardware circuit and write a C program to complete the following task: Connect two **RED** LEDs (say LED1 and LED2) and a button to your Arduino UNO. Note that the button should be connected to a counter. At the beginning, these two LEDs are in State 1 (see the diagram below) and the setting is in Mode X. When the button is pressed (and then released), these two LEDs change their states according to the diagrams and the table below. Note that you must use the timer and counter programming in the implementation.

| | State 1 | State 2 | State 3 | State 4 |
|---|---|---|---|---|
| Mode X | (ON, ON) | (ON, OFF) | (OFF, OFF) | (OFF, ON) |
| Mode Y | (OFF, OFF) | (ON, ON) | (ON, OFF) | (OFF, ON) |

| 1 | 2 | 1 | 2 |
|---|---|---|---|
| 1 | 1 | 0 | 0 |
| 1 | 0 | 1 | 1 |
| 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 1 |




Note that:

1. Exclude the overhead due to the instructions in a loop in timer programming.
2. Using simple loops without timers or using built-in functions to count the delay is not acceptable.

- End -