BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI
K. K. BIRLA GOA CAMPUS
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CS G523 Semester 2 2021 22

Comprehensive Exam

Q1) Modify the given Arduino code of a stepper motor to   **[Marks 4]**

1. Read an input number Analog port.
2. If the number is greater than the previous value the motor will rotate in clockwise direction and if it is even anticlockwise direction. The stepper will step for the difference between the current and the previous value.
3. It will delay for the duration of the magnitude of the number entered
4. It will print the cumulative motion done till now on the Serial port.

Print the cumulative steps taken clockwise and anticlockwise on the Serial monitor.

```
#include <Stepper.h>

const int stepsPerRevolution = 200;

Stepper myStepper(stepsPerRevolution, 8, 9, 10, 11);

void setup() {   myStepper.setSpeed(60);

  Serial.begin(9600);}

void loop() {  Serial.println("clockwise");

  myStepper.step(stepsPerRevolution);

  delay(500);

  Serial.println("counterclockwise");

  myStepper.step(-stepsPerRevolution);

  delay(500);}
```

Q2 Give Activity Diagram for the given two Python codes for the following diagrams   **[Marks 10]**

```
num1 = 10
num2 = 14
num3 = 12

num1 = float(input("Enter first: "))
num2 = float(input("Enter second: "))
num3 = float(input("Enter third: "))

if (num1 >= num2) and (num1 >= num3):
    largest = num1
elif (num2 >= num1) and (num2 >= num3):
    largest = num2
else:
    largest = num3

print("The largest number is", largest)
```

```
test_dict = {"Gfg": 20, "is": 36,
"best": 100}

print("The original dictionary is : " +
str(test_dict))

K = 4

temp = dict()
for key in test_dict:
    temp[key] = test_dict[key] / 4

res = []
for idx in range(K):
    res.append(temp)

print("Required dictionary list : " +
str(res))
```

Q3.   **[Marks 15]**

We are planning to develop a Web Application for the scenario given below.

Scenario: Hospital with patients whose ECG has to be monitored and Analysed. A central Server coordinates all activities.

a) Variable number of patients, ECG data at the rate of 1 millisecond.

b) Analysers-3 in number. Analysis of 1 minute of ECG data takes 5 seconds. Results have to be displayed within the 1 minute interval. The server allocates tasks to each Analyser.

i)   Give an Activity diagram for the system. Ensure that you have Swimlanes and represent all the Patient Devices, Actors and the Analysers.
ii)   Give a State chart Diagram for the system. Ensure that all possible states, transitions and events are represented.
iii)   Give a Use case diagram for the system. Ensure that you have "includes" and "extends.
iv)   Give a Timing diagram for the system (You can use 2 patients for the diagram)

Q4.   Give a Python code snippet for the Server   **[Marks 6]**
 Server code for allocation of tasks to ensure that all data is analysed with **minimum number of Analysers**. If at any time this analysis cannot be done by the 3 machines an alarm will be raised.