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**FINAL EXAMINATION
SEMESTER I
SESSION 2018/2019**

COURSE NAME : SOFTWARE ENGINEERING
COURSE CODE : BEC 41803
PROGRAMME CODE : BEJ
EXAMINATION DATE : DECEMBER 2018/ JANUARY 2019
DURATION : 3 HOURS
INSTRUCTION : ANSWER **FIVE (5)** QUESTIONS ONLY

THIS QUESTION PAPER CONSISTS OF **FIVE (5)** PAGES

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- Q1**
- (a) Describe the differences between generic software products and customized software products
(6 marks)
 - (b) List **six (6)** application types in software engineering.
(6 marks)
 - (c) According to a recent Cambridge University research, the global cost of debugging software has risen to \$312 billion annually. Explain why the cost increased? And how to reduce it?
(8 marks)
- Q2**
- (a) In general, there are **three (3)** software process models. Draw the complete diagram of one of these models based on the analysis of the following benefits:
 - i. The cost of accommodating changing customer requirements is reduced.
 - ii. It is easier to get customer feedback on the development work that has been done.
 - iii. More rapid delivery and deployment of useful software to the customer is possible.(5 marks)
 - (b) Explain the differences between functional and non-functional requirements.
(6 marks)
 - (c) **Figure Q2(c)** shows the structured specification of a requirement for an insulin pump. Transform this structure specification into the tabular specification of computation for an insulin pump.
(9 marks)



<i>Insulin Pump/Control Software/SRS/3.3.2</i>	
Function	Compute insulin dose: safe sugar level.
Description	Computes the dose of insulin to be delivered when the current measured sugar level is in the safe zone between 3 and 7 units.
Inputs	Current sugar reading (r2); the previous two readings (r0 and r1).
Source	Current sugar reading from sensor. Other readings from memory.
Outputs	CompDose—the dose in insulin to be delivered.
Destination	Main control loop.
Action	CompDose is zero if the sugar level is stable or falling or if the level is increasing but the rate of increase is decreasing. If the level is increasing and the rate of increase is increasing, then CompDose is computed by dividing the difference between the current sugar level and the previous level by 4 and rounding the result. If the result, is rounded to zero then CompDose is set to the minimum dose that can be delivered.
Requirements	Two previous readings so that the rate of change of sugar level can be computed.
Pre-condition	The insulin reservoir contains at least the maximum allowed single dose of insulin.
Post-condition	r0 is replaced by r1 then r1 is replaced by r2.
Side effects	None.

Figure Q2(c)

- Q3** (a) List the common activities of process stages in the object-oriented design process. (5 marks)
- (b) **Table Q3(b)** shows the tabular description of states and stimuli for a microwave oven. Transform the tabular description to a state diagram of the microwave oven. (15 marks)

Table Q3(b)

State	Description
Waiting	The oven is waiting for input. The display shows the current time.
Half power	The oven power is set to 300 watts. The display shows 'Half power'.
Full power	The oven power is set to 600 watts. The display shows 'Full power'.
Set time	The cooking time is set to the user's input value. The display shows the cooking time selected and is updated as the time is set.
Disabled	Oven operation is disabled for safety. Interior oven light is on. Display shows 'Not ready'.
Enabled	Oven operation is enabled. Interior oven light is off. Display shows 'Ready to cook'.
Operation	Oven in operation. Interior oven light is on. Display shows the timer countdown. On completion of cooking, the buzzer is sounded for five seconds. Oven light is on. Display shows 'Cooking complete' while buzzer is sounding.

- Q4 (a) Describe **three (3)** framework classes in software reuse. (6 marks)
- (b) Explain the differences between the configurable application system (COTS-solution) and application system integration (COTS-integrated system). (8 marks)
- (c) **Figure Q4(c)** shows the model of a data collector component for a sensor. Redraw the model by adding an adaptor linking a data collector and a sensor, where the sensor provides interface to start, stop and getdata functions. (6 marks)

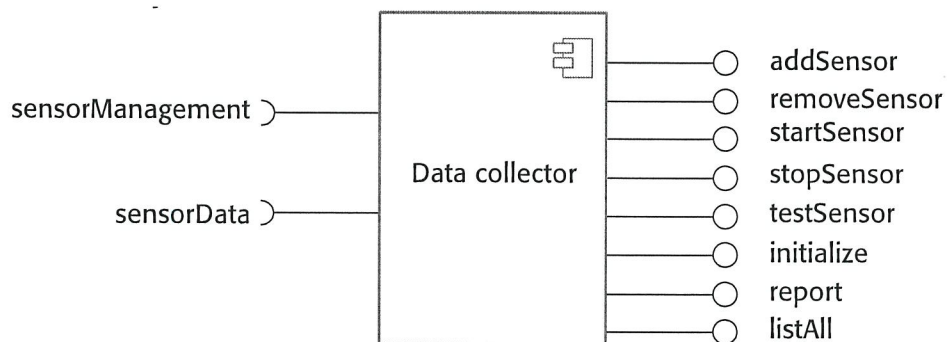


Figure Q4(c)

- Q5** (a) Describe the differences between software inspection and software testing. (6 marks)
- (b) List **five (5)** reengineering process activities. (5 marks)
- (c) Draw the risk management process diagram. (9 marks)

-END OF QUESTIONS -