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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2016/2017**

TERBUKA

COURSE NAME : SOFTWARE ENGINEERING
COURSE CODE : BIT 10103
PROGRAMME CODE : BIT
EXAMINATION DATE : JUNE 2017
DURATION : 3 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS

THIS QUESTION PAPER CONSISTS OF **SIX (6)** PAGES

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Q1 (a) Define architectural design. (2 marks)

(b) Discuss the importance of architectural design in a software development. (6 marks)

(c) Questions **Q1(c)(i)** and **Q1(c)(ii)** are based on **Figure Q1(c)**

A Petronas Petrol Station is to be set up for fully automated operation. Drivers swipe their credit card through a reader connected to the pump; the card is verified by communication with a credit company computer, and a fuel limit is established. The driver may then take the fuel required. When fuel delivery is completed and the pump hose is returned to its holster, the driver's credit card is debited with the cost of the fuel taken. The credit card is returned after debiting. If the card is invalid, the pump returns it before fuel is dispensed.

Figure Q1(c)

(i) Identify possible objects in the following systems. (6 marks)

(ii) Draw a user interface design for the objects identified in **Q1(c)(i)**. (6 marks)

Q2 Questions **Q2(a)** and **Q2(b)** are based on **Figure Q2(a)**.

As a Software Engineer, you are assigned to develop a system. The system has 10 external inputs, 20 external outputs, fields 25 different external queries, manages 4 internal logical files, and interfaces with 4 different legacy systems (4 EIFS). All of these data are of average complexity, and the overall system is relatively simple.

(Pressman 2012)

Figure Q2(a)

(a) Compute Functional Point (FP) for the system. [Refer **Figure Q2(b)** in Appendix] (12 marks)

- (b) Discuss **TWO (2)** similarities and **TWO (2)** differences between FP and COCOMO II techniques in estimating software. (8 marks)

Q3 (a) Describe requirements. (2 marks)

- (b) Determine whether the following requirements are functional or non-functional requirements. Justify your answer.

(i) Response time for short queries must be less than 3 sec. (2 marks)

(ii) In defining student record, user must be able to enter student name and be prompted for all the remaining student attributes that are needed for the student record. (2 marks)

(iii) Student information may be searched using either the student number or student's last name. (2 marks)

(iv) Student achievements reports shall be printed in the primary language of the student (2 marks)

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- (c) Draw a use case diagram according to the scenario given in **Figure Q3(c)**.

Parit Raja Real Estate Inc. (PREI) sells houses. People who want to sell their houses sign a contract with PREI and provide information on their house. This information is kept in a database by PREI and a subset of this information is sent to the Batu Pahat multiple listing service used by all real estate agents. PREI works with two types of potential buyers. Some buyers have an interest in one specific house. In this case, PREI prints information from its database, which the real estate agent uses to help show the house to the buyer (a process beyond the scope of the system to be modeled). Other buyers seek PREI's advice in finding a house that meets their needs. In this case, the buyer completes a buyer information form that is entered into a buyer data base, and PREI real estate agents use its information to search PREI's data base and the multiple listing services for houses that meet their needs. The results of these searches are printed and used to help the real estate agent show houses to the buyer.

Figure Q3(c)

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- Q4** (a) Give an example to compare between software verification and validation. (4 marks)
- (b) Questions **Q4(b)(i)** and **Q4(b)(ii)** based on **Figure Q4(b)**.

Your team members in ABC Sdn Bhd have successfully developed application software that is considered as medium to large in size. As a software tester, you are given the opportunity to choose any particular strategies to use in testing the software.

Figure Q4 (b)

- (i) Determine the strategy that you may suggest to your team member. (2 marks)
- (ii) Justify your answer in **Q4(b)(i)**. (4 marks)

- (c) Discuss the differences between White Box Testing and Black Box Testing. (4 marks)

- (d) Calculate the independent path of the program code shown in **Figure Q4(d)** using Cyclomatic Complexity.

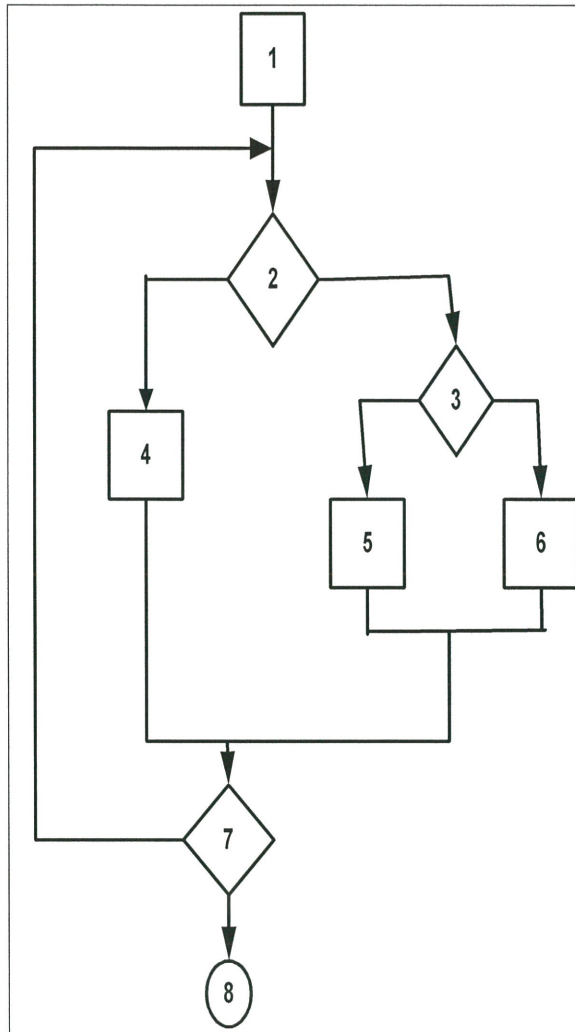


Figure Q4 (d)

(6 marks)

- END OF QUESTION -

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STEP 1: Look up low, average, and high values for external inputs, external outputs, and external queries.

File Types Referenced	Number of Data Elements Included		
	1-5	6-20	21+
0	Low	Low	Average
1-3	Low	Average	High
4+	Average	High	High

STEP 2: Look up low, average and high values for internal logical files and external interface files.

Group of Elements	Number of Data Elements Included		
	1-19	20-50	51+
0-1	Low	Low	Average
2-5	Low	Average	High
6+	Average	High	High

STEP 3: Calculate the number of unadjusted functions points (UFP) using predetermined weights. (The weights are the numbers in blue after the × sign.)

Type of Component	Number of Components	Low	Complexity of Average	Components High	Total
External inputs	5 (2, 1, 2)	2 × 3	1 × 4	2 × 6	22
External outputs	12 (4, 6, 2)	4 × 4	6 × 5	2 × 7	60
External queries	20 (5, 10, 5)	5 × 3	10 × 4	5 × 6	85
Internal logical files	13 (3, 5, 5)	3 × 7	5 × 10	5 × 15	146
External interface files	2 (1, 0, 1)	1 × 5	0 × 7	1 × 10	15
Total unadjusted function points					328

STEP 4: Determine the value adjustment factor (VAF) by rating each system characteristic and calculating a subtotal, then dividing it by 100.

System Characteristic (Rate 0 for no effect; 5 for strong effect)	Rating
Data communications	2
Distributed data processing	2
Performance	0
Heavily used configuration	0
Transaction rate	0
Online data entry	0
End user efficiency	0
Online update	0
Complex processing	0
Reusability	2
Installation ease	3
Operational ease	3
Multiple sites	3
Facilitate change	1
VAF = Total divided by 100 =	16/100 = 0.16

STEP 5: Calculate the number of adjusted function points using the following formula:

$$FPC = UFP \times (0.65 + VAF) = 328 + (0.65 + 0.16) = 328 \times 0.81 = 266$$

Figure Q2(b)

