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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2014/2015**

COURSE NAME : SOFTWARE ENGINEERING
COURSE CODE : BIT 10103
PROGRAMME : 2 BIT
EXAMINATION DATE : JUNE 2015 / JULY 2015
DURATION : 2 HOURS AND 30 MINUTES
INSTRUCTION : ANSWER ALL QUESTIONS.

THIS QUESTION PAPER CONSISTS OF FIVE (5) PAGES

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- Q1** (a) Define software design phase. (2 marks)
- (b) Describe **FOUR (4)** quality guidelines for design activities. (8 marks)
- (c) Explain how Functionality, Usability, Reliability, Performance and Supportability (FURPS) are assessed as the quality attributes in designing software. (10 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) List **TWO (2)** activities in requirements engineering.

(2 marks)

- (b) Determine the functional and non-functional requirements based on the requirements statements listed in Figure **Q3(b)**. Justify your answer.

- (i) Response time for short queries must be less than 1 sec.
- (ii) In defining employee record, user must be able to enter employee name and be prompted for all the remaining employee attributes that are needed for the employee record.
- (iii) Employee information may be searched using either the employee number or employee's last name.
- (iv) Only authorized (employee himself, managers in his/her chain of command, personnel) search will show employee salary, benefits, and family information.

FIGURE Q3(b)

(8 marks)

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

This is a scenario of student registration system. The system will enable the student to register courses. A drop course option should be enabled. Student may view registered courses either by display or print. Lecturer can view student registration whereby he/she can view only his/her own taught course. Lecturer can have option to print the student registration list. Nevertheless, lecturer neither creates nor removes courses. This job is under the responsibility of the administrator who can create a new semester as well. A remove course option should be enabled.

FIGURE Q3(c)

(10 marks)

- Q4** (a) Explain the differences between software verification and validation.
(4 marks)
- (b) Draw a spiral diagram that maps several types of testing strategies to phases of software development.
(4 marks)
- (c) State **FOUR (4)** issues that need to be addressed for a successful testing strategy.
(4 marks)
- (d) Explain **FOUR (4)** types of integration testing.
(8 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)