



UNIVERSITI SAINS MALAYSIA

First Semester Examination
2016/2017 Academic Session

December 2016 / January 2017

CPT341 – Software Design & Architecture *[Reka Bentuk & Seni Bina Perisian]*

Duration : 2 hours
[Masa : 2 jam]

INSTRUCTIONS TO CANDIDATE:

[ARAHAN KEPADA CALON:]

- Please ensure that this examination paper contains **SEVEN** questions in **EIGHT** printed pages before you begin the examination.

*[Sila pastikan bahawa kertas peperiksaan ini mengandungi **TUJUH** soalan di dalam **LAPAN** muka surat yang bercetak sebelum anda memulakan peperiksaan ini.]*

- Answer **ALL** questions.

*[Jawab **SEMUA** soalan.]*

- You may answer the questions either in English or in Bahasa Malaysia.

[Anda dibenarkan menjawab soalan sama ada dalam bahasa Inggeris atau bahasa Malaysia.]

- In the event of any discrepancies, the English version shall be used.

[Sekiranya terdapat sebarang percanggahan pada soalan peperiksaan, versi bahasa Inggeris hendaklah diguna pakai.]

1. (a) Name all views in a 4+1 Software Architectural View Model.

Namakan semua pandangan di dalam Model Pandangan Seni Bina Perisian 4+1.

(5/100)

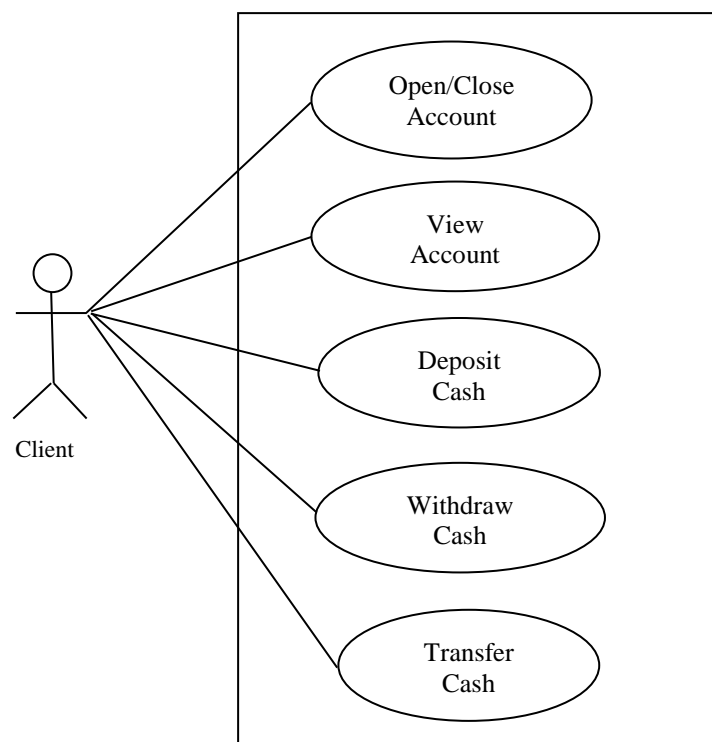
- (b) Name **two (2)** stakeholders that belong to each view.

*Namakan **dua (2)** pemegang taruh untuk setiap pandangan tersebut.*

(4/100)

2. The software organization you are working with is specialized in banking applications. As the software engineer involved in an automated teller machine (ATM) project, you have been assigned by the project manager to train a group of junior programmers of the organization. Figure 1 shows the use case diagram of the ATM system. You need to prepare the following items given by the project manager:

Organisasi perisian di mana anda bekerja adalah mengkhusus di dalam aplikasi perbankan. Sebagai jurutera perisian yang terlibat di dalam projek mesin juruwang automatik (ATM), anda telah diarahkan oleh pengurus projek untuk melatih sekumpulan pengatur cara baru organisasi tersebut. Rajah 1 menunjukkan rajah kes guna sistem ATM tersebut. Anda perlu menyediakan beberapa perkara yang diberikan oleh pengurus projek anda seperti berikut:



*Figure 1: Use Case Diagram of the ATM system
Rajah 1: Rajah kes guna sistem ATM*

- (a) Draw the architectural style diagram of your choice and describe the concept of the style.

Lukiskan gambar rajah gaya seni bina pilihan anda dan terangkan gaya konsep tersebut.

(7/100)

- (b) State **one (1)** advantage and **one (1)** constraint of the proposed style?

*Nyatakan **satu (1)** kelebihan dan **satu (1)** kekangan terhadap gaya yang dicadangkan.*

(2/100)

3. (a) Figure 2 shows a structure chart of a program. Describe the scenario using pseudocode form.

Rajah 2 menunjukkan carta struktur sesuatu program. Terangkan senario dengan menggunakan bentuk pseudokod.

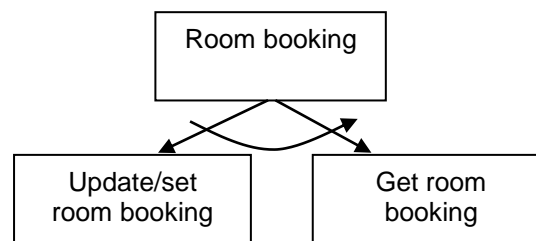


Figure 2: Structure Chart
Rajah 2: Carta Struktur

(4/100)

- (b) Figure 3 is a component diagram of the system. Explain the system in term of its interface and dependency.

Rajah 3 adalah gambar rajah komponen sesuatu sistem. Terangkan sistem tersebut di dalam konteks antara muka dan kebergantungan.

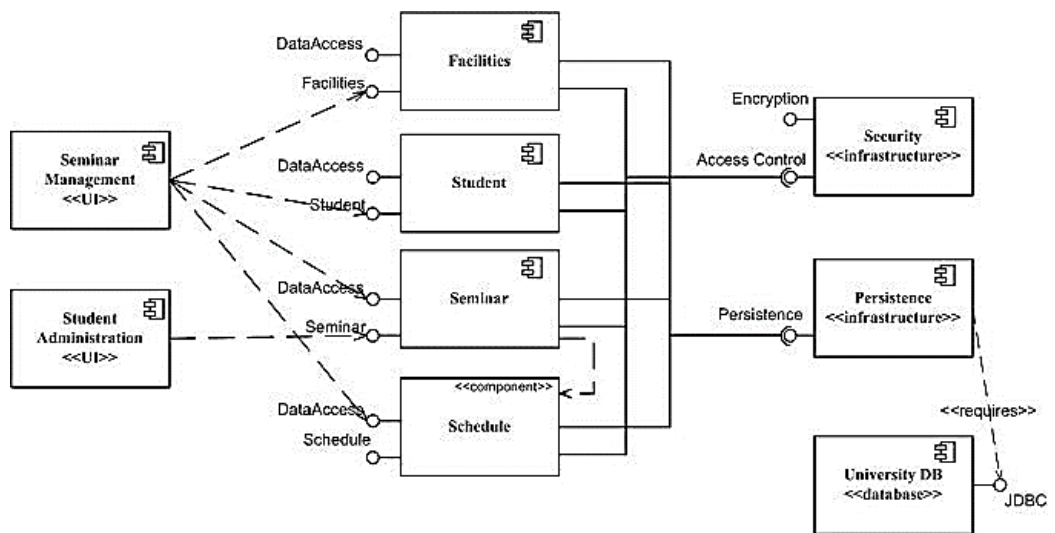


Figure 3: A Component diagram
Rajah 3: Gambar rajah komponen

(4/100)

- (c) Figure 4 is a deployment diagram of a system. Explain the system in term of its resources.

Rajah 4 adalah gambar rajah pelaksanaan. Terangkan sistem dalam konteks sumbernya.

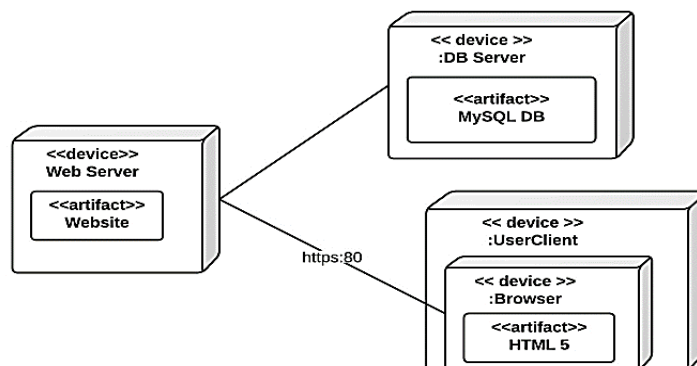


Figure 4: A deployment diagram
Rajah 4: Gambar rajah pelaksanaan

(4/100)

4. (a) Based on the package diagram of a system at Figure 5, name **two (2)** architecture styles used in the diagram below? Justify your answer.

Berdasarkan gambar rajah pakej untuk suatu sistem di dalam Rajah 5, Namakan **dua (2)** gaya seni bina yang diguna pakai di dalam gambar rajah di bawah. Tentukan jawapan anda.

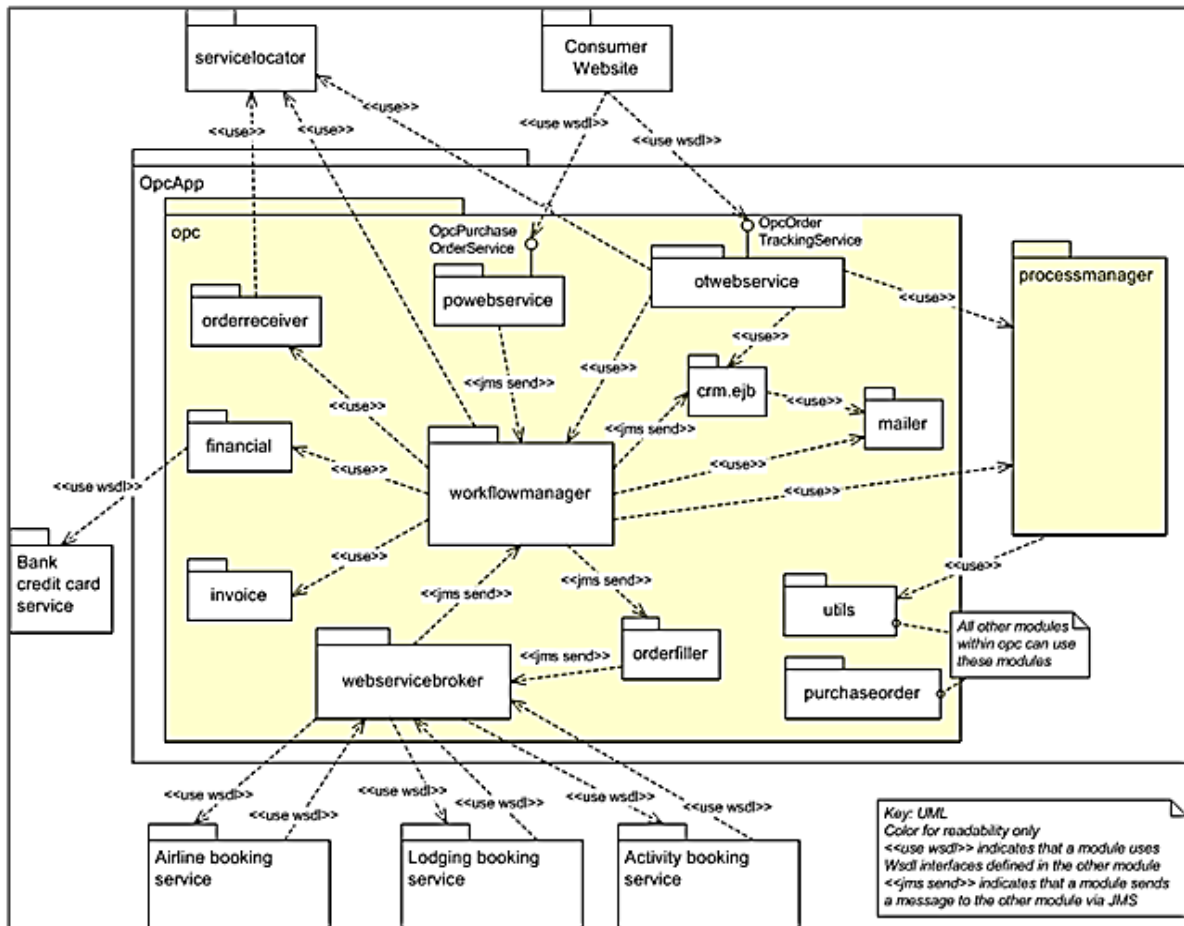


Figure 5: A package diagram of a system
Rajah 5: Gambar rajah pakej suatu sistem

(4/100)

- (b) Based on the class diagram of an online shopping at Figure 6, answer the following questions.

Berdasarkan gambar rajah kelas untuk pembelian atas talian di Rajah 6, jawab soalan-soalan berikut.

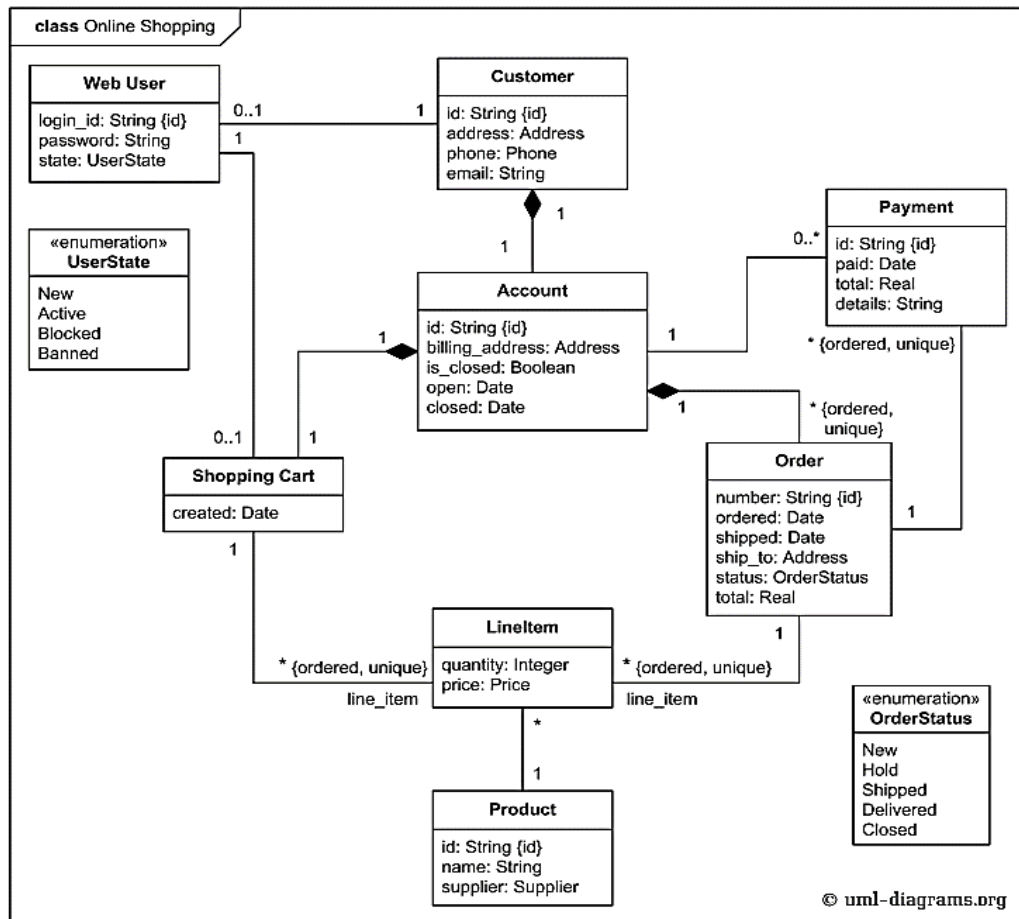


Figure 6: A diagram of an online shopping system
 Gambar Rajah 6: Gambar rajah sistem pembelian secara talian

- (i) Name the architecture style used for the system.

Namakan gaya seni bina yang di guna pakai di dalam sistem ini.

(4/100)

- (ii) Convert the diagram into three-layer architecture style?

Tukarkan gambar rajah tersebut kepada gaya seni bina tiga-lapisan.

(4/100)

5. (a) Name all design principles in the software design.

Namakan semua asas-asas reka bentuk di dalam reka bentuk perisian.

(6/100)

- (b) Explain the meaning of the following terms (give an example in your explanation).

Terangkan makna terma-terma di bawah (berikan contoh di dalam penerangan anda).

- (i) Cohesion.

Kohesi.

(5/100)

- (ii) Primitiveness.

Primitif.

(5/100)

6. (a) List and briefly explain the **six (6)** strategies of software design.

Senarai dan terangkan secara ringkas enam (6) strategi reka bentuk perisian.

(6/100)

- (b) Explain the approach (with an example).

Jelaskan pendekatan tersebut (berserta contoh).

- (i) Component-based design method.

Kaedah reka bentuk berasaskan komponen.

(6/100)

- (ii) Function-oriented (structured) design method.

Kaedah reka bentuk berorientasikan fungsi.

(6/100)

- (c) Explain how you apply strategies in Question 6(a) and methods in Question 6(b) in practice during the software design stage.

Terangkan bagaimana anda mengaplikasikan strategi-strategi dalam Soalan 5(a) dan kaedah-kaedah ini dalam Soalan 5(b) di peringkat reka bentuk perisian.

(4/100)

7. (a) Name and briefly discuss **two (2)** techniques that can be used in the software design review task.

Namakan dan bincangkan secara ringkas dua (2) teknik yang boleh digunakan di dalam tugas kaji semula reka bentuk perisian.

(6/100)

- (b) Name **two (2)** attributes that can be measured in the quality assessment stage of software design.

Namakan dua (2) ciri-ciri yang boleh diukur di peringkat penilaian kualiti reka bentuk perisian.

(4/100)

- (c) Figure 7 shows a car park class which keeping update the number of car park space left of a car park system. Answer the following question.

Rajah 7 menunjukkan kelas sistem letak kereta iaitu untuk mengemaskinikan bilangan ruang letak kereta. Jawab soalan berikut.

Car Park
Capacity Space
Increment space() Decrement spaces() Spaces left()

Figure 7: Class of car park system
Rajah 7: Kelas sistem letak kereta

- (i) Calculate the function point value for this class.

Kirakan nilai mata fungsi untuk kelas tersebut.

(5/100)

- (ii) Calculate the cyclomatic complexity for this class

Kirakan kompleksiti saiklomatik untuk kelas tersebut.

(5/100)