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UNIVERSITI SAINS MALAYSIA

First Semester Examination  
2011/2012 Academic Session

January 2012

**CIT542 – Platform Technologies and Programming**  
*[Teknologi Pelantar dan Pengaturcaraan]*

Duration : 2 hours  
*[Masa : 2 jam]*

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**INSTRUCTIONS TO CANDIDATE:**

*[ARAHAN KEPADA CALON:]*

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

*[Sila pastikan bahawa kertas peperiksaan ini mengandungi **EMPAT** soalan di dalam **SEMBILAN** 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) (i) How would you write the following arithmetic expression in Java?

$$\frac{4}{3(r+34)} - 9(a+bc) + \frac{3+d(2+a)}{a+bd}$$

- (ii) Describe syntax errors, runtime errors and logic errors.

(30/100)

(b) 

```
public class Test {
    /** Main method */
    public static void main(String[] args) {
        int i = 0;
        while (i < 6) {
            for (int j = i; j > 1; j--)
                System.out.print(j + " ");
            System.out.println("***");
            i++;
        }
    }
}
```

- (i) Show the output of the above program.

- (ii) Rewrite the `while` and `for` loop in the program above into a nested `do while` loops.

(40/100)

- (c) Suppose  $x = 5$  and  $y = 4$ , show the output, if any, of the following code. What is the output if  $x = 5$  and  $y = 6$ ? What is the output if  $x = 4$  and  $y = 4$ ?

```
if (x > 4) {
    if (y > 4) {
        int z = x + y;
        System.out.println("z is " + z);
    }
}
else
    System.out.println(" x is " + x);
```

(30/100)

2. (a) What is pass by value? Show the result of the following program:

```
public class Test {
    public static void main(String[] args) {
        int i = 0;
        while (i <= 4) {
            xMethod(i);
            i++;
        }

        System.out.println("i is " + i);
    }

    public static void xMethod(int i) {
        while (i >= 1) {
            if (i % 3 != 0)
                System.out.print(i + " ");
            i--;
        }

        System.out.println();
    }
}
```

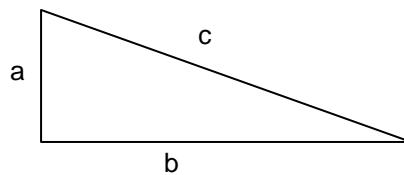
(20/100)

- (b) What is wrong in the following code? Rewrite the code correctly using a `switch` statement in Java.

```
if (score >= 60.0)
    grade = 'D';
else if (score >= 70.0)
    grade = 'C';
else if (score >= 80.0)
    grade = 'B';
else if (score >= 90.0)
    grade = 'A';
else
    grade = 'F';
```

(40/100)

- (c) Write a function to compute the perimeter and area of a right triangle as shown below when given the length of the two sides ( $a$  and  $b$ ) passed as arguments.



(40/100)

3. (a) List **three (3)** differences between application software and system software. Provide one example of application software and one example of system software.

(20/100)

- (b) For the following, show all the steps involved:

(i) Convert  $3B7.C_{16}$  into decimal.

(ii) Convert  $83.25_{10}$  into binary.

(40/100)

- (c) The following are some of the actions (P1 to P8) performed by the central processing unit (CPU) when a program is executing:

P1: Increment program counter (PC).  
 P2: Pass data inputs through internal circuits to perform operation.  
 P3: Separate instruction into components – instruction code and data inputs.  
 P4: Store results in register.  
 P5: Store instruction code and data inputs to separate registers.  
 P6: Retrieve data inputs from register.  
 P7: Fetch instruction from main memory (RAM).  
 P8: Retrieve instruction code from register.

(i) List, in the correct order, the actions performed by control unit.

(ii) List, in the correct order, the actions performed by arithmetic and logic unit (ALU).

(40/100)

4. (a) Briefly explain **one (1)** advantage and **one (1)** disadvantage of the following media access control (MAC) protocols:

(i) Carrier Sense Multiple Access / Collision Detection (CSMA/CD),

(ii) Token Passing.

(20/100)

- (b) Modern operating systems (for example Windows XP and Linux) use multitasking memory allocation technique.

(i) Briefly describe **two (2)** reasons why this technique is popular.

(ii) Name **one (1)** problem associated with this technique.

(iii) Explain a solution to the problem mentioned in 4(b)(ii).

(30/100)

(c) Briefly describe the following terms (in not more than three lines each):

- (i) System bus
- (ii) XOR logic gate
- (iii) Read Only Memory (ROM)
- (iv) Serial transmission
- (v) Operating system kernel

(50/100)

1. (a) (i) Bagaimanakah anda menulis ungkapan aritmetik berikut dalam Java?

$$\frac{4}{3(r+34)} - 9(a+bc) + \frac{3+d(2+a)}{a+bd}$$

- (ii) Terangkan ralat sintaks, ralat masa larian dan ralat logik.

(30/100)

(b) 

```
public class Test {
    /** Main method */
    public static void main(String[] args) {
        int i = 0;
        while (i < 6) {
            for (int j = i; j > 1; j--)
                System.out.print(j + " ");
            System.out.println("****");
            i++;
        }
    }
}
```

- (i) Berikan output atur cara di atas.

- (ii) Tulis semula gelung while dan for dalam atur cara di atas ke gelung bersarang do while.

(40/100)

- (c) Jika  $x = 5$  dan  $y = 4$ , beri output, pada kod-kod berikut, jika ada. Apakah output jika  $x = 5$  dan  $y = 6$ ? Apakah output jika  $x = 4$  dan  $y = 4$ ?

```
if (x > 4) {
    if (y > 4) {
        int z = x + y;
        System.out.println("z is " + z);
    }
}
else
    System.out.println(" x is " + x);
```

(30/100)

2. (a) Apakah penghuluran melalui nilai? Berikan output atur cara berikut:

```
public class Test {
    public static void main(String[] args) {
        int i = 0;
        while (i <= 4) {
            xMethod(i);
            i++;
        }

        System.out.println("i is " + i);
    }

    public static void xMethod(int i) {
        while (i >= 1) {
            if (i % 3 != 0)
                System.out.print(i + " ");
            i--;
        }

        System.out.println();
    }
}
```

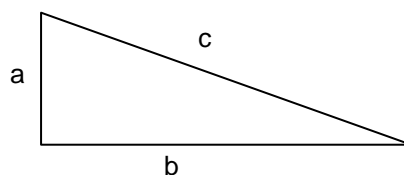
(20/100)

- (b) Apakah kesilapan dalam kod berikut? Tulis semula kod ini dengan betul dengan menggunakan kenyataan `switch` dalam Java.

```
if (score >= 60.0)
    grade = 'D';
else if (score >= 70.0)
    grade = 'C';
else if (score >= 80.0)
    grade = 'B';
else if (score >= 90.0)
    grade = 'A';
else
    grade = 'F';
```

(40/100)

- (c) Tulis satu fungsi yang akan mengira perimeter dan luas suatu segi tiga sudut tepat di bawah apabila diberi lebar dua segi ( $a$  dan  $b$ ) dihantar sebagai parameter.



(40/100)

3. (a) Senaraikan **tiga (3)** perbezaan di antara perisian aplikasi dan perisian sistem. Berikan satu contoh bagi perisian aplikasi dan satu contoh bagi perisian sistem.

(20/100)

- (b) Tunjukkan semua langkah-langkah yang terlibat berikut:

(i) Tukar  $3B7.C_{16}$  kepada persepuluhan.

(ii) Tukar  $83.25_{10}$  kepada perduaan.

(40/100)

- (c) Langkah-langkah (P1 hingga P8) yang dijalankan oleh unit pemprosesan pusat (CPU) semasa pelaksanaan aturcara adalah seperti berikut:

P1: Menokok pembilang aturcara (PC).  
 P2: Menyalur data input melalui litar dalaman untuk melaksana operasi.  
 P3: Memisahkan arahan kepada komponennya – kod arahan dan data input.  
 P4: Menyimpan hasil dalam daftar.  
 P5: Menyimpan kod arahan dan data input ke dalam daftar berasingan.  
 P6: Mengambil data input daripada daftar.  
 P7: Mengambil arahan daripada ingatan utama (RAM).  
 P8: Mengambil kod arahan daripada daftar.

(i) Senaraikan, dalam turutan yang betul, langkah-langkah yang dilaksanakan oleh unit kawalan.

(ii) Senaraikan, dalam turutan yang betul, langkah-langkah yang dilaksanakan oleh unit aritmetik dan logik (ALU).

(40/100)

4. (a) Terangkan secara ringkas **satu (1)** kebaikan dan **satu (1)** keburukan untuk protokol kawalan capaian media (MAC) berikut:

(i) Capaian Berbilang Deria Pembawa / Pengesanan Pelanggaran (*Carrier Sense Multiple Access / Collision Detection (CSMA/CD)*),

(ii) Penghuluran Token (*Token Passing*).

(20/100)

- (b) Sistem pengendalian moden (contoh *Windows XP* dan *Linux*) menggunakan teknik peruntukan ingatan berbilang tugas.

(i) Terangkan secara ringkas **dua (2)** sebab kenapa teknik ini popular.

(ii) Namakan **satu (1)** masalah yang berkait dengan teknik ini.

(iii) Jelaskan satu penyelesaian kepada masalah yang dibangkitkan dalam 4(b)(ii).

(30/100)



(c) Terangkan secara ringkas istilah-istilah berikut (setiapnya tidak melebihi tiga baris):

- (i) Bas sistem
- (ii) Get logik XOR
- (iii) Ingatan baca sahaja (ROM)
- (iv) Penghantaran bersiri
- (v) Inti sistem pengendalian

(50/100)