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**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

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

COURSE NAME : COMPUTER PROGRAMMING  
COURSE CODE : BEC10102  
PROGRAMME CODE : BEJ / BEV  
EXAMINATION DATE : DECEMBER 2016 / JANUARY 2017  
DURATION : 2 HOURS  
INSTRUCTION : ANSWER ALL QUESTIONS.

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THIS QUESTION PAPER CONSISTS OF SEVEN (7) PAGES

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**Q1** (a) Based on the following pseudo code:

1. **Begin**
2. **Read Y, Z**
3. **If Y is shorter than Z**
  - 3.1 **LONG = Z**
  - 3.2 **SHORT = Y**
4. **Else**
  - 4.1 **LONG = Y**
  - 4.2 **SHORT = Z**
5. **Write (Display) LONG, SHORT**
6. **End**

(i) Describe its first and second phases of Standard Development Method.

(5 marks)

(ii) Analyse the pseudo code and transform it to a flowchart.

(13 marks)

(b) The loop shown below has been written by an inexperienced C/C++ programmer. The behavior of the loop is not correctly represented by the formatting.

```
1 | int n = 10;  
2 | while (n > 0)  
3 |     n /= 2;  
4 | cout << n * n << endl;
```

(i) What is the output of the loop as it is written?

(3 marks)

(ii) Correct the syntax of the loop so that the *logic* of the corrected loop corresponds to the *formatting* of the original loop. What is the output of the corrected loop?

(4 marks)

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- Q2** (a) Write a program that ask for user input from 5 to 9 then calculate the average. (8 marks)
- (b) The electric company charges customers according to the following rate schedule for kilowatt-hours (kWh) used:
- 8 cents a kWh for the first 300 kWh
  - 6 cents a kWh for the next 300 kWh (up to 600 kWh)
  - 5 cents a kWh for the next 400 kWh (upto 1000 kWh)
  - 3 cents a kWh for all electricity used over 1000 kWh
- Write a **complete** C++ program to calculate the total charge for a customer. Your program should:
- (i) Obtain the kilowatt-hours used by a customer. (3 marks)
- (ii) Calculate and the charge for electricity. (7 marks)
- (iii) Display the charge in dollars with 2 digits after the decimal point. (2 marks)
- (c) Determine whether TRUE or FALSE for statements in (i) to (v).
- (i) A variable name indirectly references a value, whereas a pointer directly references a value. (1 marks)
- (ii) The \* operator is referred as dereferencing operator. (1 marks)
- (iii) A pointer can be initialised using 0, NULL or an address. (1 marks)
- (iv) The && operator returns the memory address of its operand. (1 marks)

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- (v) `void Display (int *sum)` shows the `Display` function is called using pass-by-reference mechanism.

(1 marks)

- Q3** (a) Analyse the following program of **Program Q3(a)**. (Note that line numbers have been added to you identify certain parts of the program.)

```
1  #include<iostream.h>
2  int  balance_owed;    //amount owed
3
4  main()
5  {
6      cout<<"Enter number of dollars owed:";
7      cin>>balance_owed;
8
9      if (balance_owed= 0)
10         cout<<"You owe nothing.\n";
11     else
12         cout<<"You owe"<<balance_owed<<
13         "dollars.\n";
14
15     return (0) ;
}
```

For some strange reason, the given **Program Q3(a)** thinks that everyone owes a balance of 0 dollars. Why?

(6 marks)

- (b) Write a `for` loop code that calculates the sum of the first  $n$  natural numbers. For example, if the number entered is 5, the loop will calculate  $1 + 2 + 3 + 4 + 5 = 15$ .

(6 marks)



(c) Convert the following *for* loop code to a *while* loop code.

```
1 | for (int x = 30; x > 0; x--)  
2 |     {  
3 |         cout << x << count << "second to go.\n";  
4 |     }
```

(6 marks)

(d) Analyse the following program.

```
1. | #include <iostream>  
2. | using namespace std;  
3. |  
4. | int fun (int x, int* y);  
5. |  
6. | int main ( )  
7. | {  
8. |     int a, b, c;  
9. |     a = 9;  
10. |    c = fun(a, &b);  
11. |    cout << "a=" << a  
12. |        << " b=" << b  
13. |        << " c=" << c << ".\n";  
14. |    return 0;  
15. | }  
16. |  
17. | int fun (int x, int* y) {  
18. |     *y = x/2;  
19. |     x = 13;  
20. |     cout << "x=" << x << " y=" << *y << ".\n";  
21. |     return (*y - x);  
22. | }
```

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Investigate the output produced by the program. Note: Show how you obtained the value for the output.

(7 marks)

- Q4** (a) With the aid of diagram, explain the differences between the following arrays.

```
char s1[]={ 'a', 'b', 'c' };  
char s2[] = "abc";
```

(8 marks)

- (b) What is the difference between an ARRAY and a LIST?  
(4 marks)

- (c) (i) Write a function that swaps the values of two integers, using int\* as the argument type.  
(4 marks)

- (ii) Tell how to check whether a linked list is circular  
(4 marks)

- (d) The **Program 4(d)** below reads a list of five numbers and counts the number of threes and sevens in the data.

```
1. | include <iostream.h>  
2. |  
3. | int seven_count; /*Number of sevens in the data/*  
   | int data [5]; /* The data to count 3 and 7 in/*  
   | int three_count; /*Number of threes in the data/*  
   | int index; /*Index into the data/*  
4. |  
5. | main() {  
6. |     seven_count= 0;  
7. |     three_count= 0;  
8. |  
9. |     cout<<"Enter5 numbers\n";
```

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```
10. | cin>>data[1]>>data[2]>>data[3]>>
    | data[4]>>data[5];
11. |
12. | for (index= 1;index<=5;++index)
13. | if (data[index]==3)
14. | ++three_count;
15. | If (data[index]==7)
16. | ++seven_count;
17. | }
18. |
19. | cout<<"Threes" <<three_count<<" Sevens"
    | <<seven_count<<'\n';
20. | return(0);
21. | }
```

Why does **Program 4(d)** give us the wrong answers?

(5 marks)

**- END OF QUESTIONS -**

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