Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2018/2019

COURSE NAME	:	ALGORITHM AND PROGRAMMING
COURSE CODE	:	BIC10204
PROGRAMME CODE	:	BIS / BIP / BIW / BIM
EXAMINATION DATE	:	DECEMBER 2018 / JANUARY 2019
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **EIGHT (8)** PAGES

SECTION A

State whether each of the following statement is TRUE or FALSE.

Q1 Pseudocode is a special form of machine language produced by the C compiler.

Q2 The loop repetition condition of a `while` or `for` statement can be false before the loop begins to execute.

Q3 In a `for` statement, you may only increment or decrement the loop counter by one.

Q4 A local variable of a function is not visible in any other function.

Q5 A function's return type may not be an array.

Q6 An array must be initialized when it is declared.

Q7
```
nums[0] = nums[25];
```

Q8 The assignment operator = can be used for string assignment only when initializing a string variable in its declaration.

Q9 When an array is passed to a function, the function operates on a local copy of the array.

Q10 The string library function `strcmp` compares the lengths of two strings.

(10 marks)

SECTION B
Answer ALL questions.

Q11 Write a valid C code segment for each of the following items:

(a) Read an integer number from keyboard and store it in the variable `intNum`.
(2 marks)

(b) Print the value stored in variable `price` in two floating point format.
(2 marks)

(c) Declare a constant `MIN` with a value of `332.11`.
(2 marks)

(d) Write the C statement that will close a file called `accounts`.
(2 marks)

(e) Declare and initialize an array of pointers called `MyAnimal` that stores the following string constants: "lions", "tigers", "bears".
(2 marks)

Q12 Determine the output of the following code segments.

(a)
```
#include<stdio.h>
#include<conio.h>

void main()
{
      int _=6;
      int __=9;

      do
      {
            _-=4;
            printf ("%d %d",__+2,_);
      }
      while (__!=9);

}
```
(6 marks)

(b)

```
#include <stdio.h>

int main (void)
{
      int i = 0, j = 21;
      for (; i < j; i += 2, j -= 3)
            printf("%d\n", i*j);
      printf("%d,%d\n", i, j);
      return 0;
 }
```

(6 marks)

(c)

```
#include <stdlib.h>
#include <stdio.h>

void mystery(int **pp1, int **pp2)
{
      int *temp = *pp1;
      *pp1 = *pp2;
      *pp2 = temp;
}

void main()
{
      int *p1 = NULL;
      int *p2 = NULL;
      int *p3 = NULL;

      p1 = (int*)malloc(sizeof(int));
      *p1 = 5;
      p3 = p1;
      p2 = (int*)malloc(sizeof(int));
      *p2 = *p3;
      *p2 = (*p2)+1;
      printf("%d %d %d\n", *p1, *p2, *p3);
      mystery(&p1,&p2);
      printf("%d %d %d\n", *p1, *p2, *p3);
      free(p1);
      free(p2);
      p1 = NULL;
      p2 = NULL;
      p3 = NULL;
      return 0;
}
```

(4 marks)

(d)

```
#include <stdio.h>
#include <string.h>

void printPattern (char *s)
{
      int j = strlen(s);
      int k, i;

for (k = 0; k < j; k++)
{
      printf("%s", s+k);
      for (i = j - 1; i >= k; i--)
      printf("%c", *(s+i));
      printf("\n");
}
}

int main (void)

{
      char *t = "aps105";
      printPattern(t);
}
```

(4 marks)

Q13 (a) Based on **Figure Q13(a)**, analyze and write C code for the following flowchart. Assume the user inputs an integer variable.

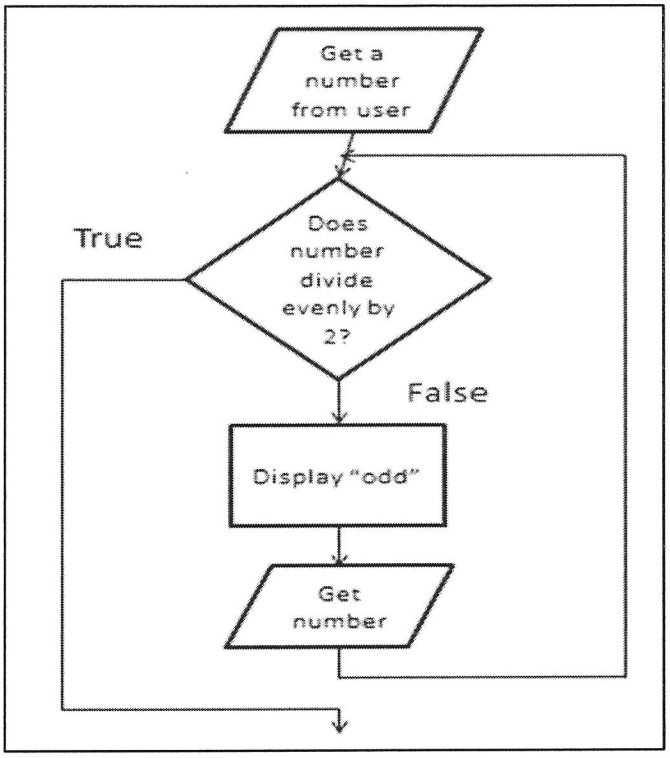

Figure Q13(a)

(4 marks)

(b) Based on **Figure Q13(b)**, develop a program by using concept of counting loops.

```
Output:
        0       1
        1       2
        2       4
        3       8
        4       16
        5       32
        6       64
```

Figure Q13(b)

(6 marks)

(c) Rewrite the following code segment as an equivalent segment that uses a `for` statement.

```
product = 1;
next = 1;
while (next <= m) {
     product = product * next;
     next = next + 1;
}
```

(4 marks)

(d) Rewrite the following `if` statement as an equivalent `switch` statement. The variable digit is of type `int`.

```
if (digit == 0)
     value = 3;
else if (digit == 1)
     value = 3;
else if (digit == 2)
     value = 6;
else if (digit == 3)
     value = 9;
```

(6 marks)

Q14 Based on the following scenario, answer **ALL** questions.

InternetLite Corporation is an Internet service provider that charges customers a flat rate of RM7.99 for up to 10 hours of connection time. Additional hours or partial hours are charged at RM1.99 each.

(a) Design your program using a pseudo code.

(6 marks)

(b) Write a function `charges` that computes and return the value of total charge for customer based on the number of hours of connection time used in a month.

(6 marks)

(c) Write a main function that takes data from an input file `usage.txt` and produces an output file `charges.txt`. The data file format is as follows:

```
usage.txt

10    2009
15362 4.2
42768 11.1
11111 9.9
```

```
                    charges.txt

Charges for 10 / 2009

Customer    Hours used  Charge per hour   Average cost
15362       4.2         7.99              1.90
42768       11.1        11.97             1.08
11111       9.9         7.99              0.81
```

(8 marks)

Q15 Consider the following scenario:

As a developer, you were assigned to develop a program that can process a collection of the speeds of vehicles (more than 20 vehicles). Your program should count and print the number of vehicles moving at a high speed (111 km/h or higher), number of vehicles moving at medium speed (60 - 110 km/h), and the number of vehicles moving at a slow speed (less than 60 km/h). It should also display the category of each vehicle.

The collections of speed is provided below:

```
43 23 54 57 68 67 51 90 33 22 112 88 34 52
75 122 78 32 89 141 65 67 97 53 10 47 34
```

(a) Design your program using a flow chart.

(8 marks)

(b) Write a C program based on your flow chart.

(10 marks)

(c) Produce a sample output based on your program in **Q15(b)**.

(2 marks)

- END OF QUESTIONS -