

Duration: 2:00 Hours

Group: _____.

Name: _____

Date: _____.

Data Structure and Algorithms Final Exam

Part I: answer the following two questions:

Q.1 True or False

1. The compiler translates all the program at once and keep a copy of the translated program in a separate file. ()
2. A global variable is declared inside of any function ()
3. Control always return to the caller when the function terminates. ()
4. If you don't initialize an array of integers, the elements of that array will be set by zero values. ()
5. High-Level language is more easier and faster than low-level language ()
6. The switch statement can deal with integer and character data types. ()
7. In C Programming language, any function can call any function except *main*, it could not be called by any another function. ()
8. The local variables can be accessed by any function. ()

Q.2 Select the correct answer(s):

1. When you run the following piece of code, the output will be:

```
for (i=10 ; i >=0 ; i -= 5)
{
    printf ("i = %d \t " , 10-(i-1));
}
```

- a- i=1 i=5 i=10
- b- i=1 i=6 i=11
- c- i=1 i=6
- d- i=1 i=2 i=3

2. In the array below, how can you access the element which has the value 4:

```
int arr[3][3]={        {1,2,3}, {4,5,6}, {7,8,9} };
```

- a- arr[0][0]
- b- arr[0][1]
- c- arr[1][0]
- d- arr[1][1]

3. "The key of is that you have to determine if you are dealing with the data or you are dealing with the address of data"

- a- Structure
- b- Pointers
- c- Stack
- d- Binary Search Tree

4. You have the following piece of code:

```
int x = 0 , y = 4 ;
while ( x < 11)
```

```
{
    y --;
    x + = 2 * y ;
}
```

when the loop has finished the value of x is :

- a- 1
- b- 12
- c- 13
- d- 14

5. An array is a collection of variables of:

- a- Different data types scattered throughout memory
- b- The same data type scattered throughout memory
- c- The same data type placed next to each other in memory
- d- Different data types placed next to each other in memory

6. You have the following piece of code:

```
int i;
for (i = 0; i < 10; i++);
{
    printf("\t %d", i);
}
```

The output on the screen will be :

- a. 1 2 3 4 5 6 7 8 9 10
- b. 0 1 2 3 4 5 6 7 8 9
- c. 10
- d. none of the above.

7. When you run the following piece of code, the output will be:

```
int x=35;
switch(x)
{
    case 20:
        printf("\n value of X < 20 and equal: %d", x);
        break;
    case 30:
        printf("\n value of X > 30 and equal: %d", x);
        break;
    default:
        printf("\n value of X is: %d", x);
        break;
}
```

- a- value of X > 30 and equal: 35
- b- value of X > 20 and equal: 35
- c- value of X is: 35
- d- none of the above.

8. While loop is more appropriate than a for loop when:

- a- The terminating condition occurs unexpectedly.
- b- The body of the loop will be executed at least once.
- c- the program will be executed at least once.
- d- The number of times the loop will be executed is known before the loop is executed.

9. Type casting is to:

- a- Convert a lower type to higher type
- b- Change the type of the variable
- c- Obtain the correct value of an Expression
- d- Make an explicit type conversion.

Part II: Answer the following two questions:**Q.3**

a- Write a structure to use it to store data of a customer in a home delivery system of take-away restaurant. The needed data of a customer is the phone number, address, postal code, and customer Name.

b- Write the line of code to declare an array of your structure with 37 elements.

c- Could you make an array of this structure with size N? Where N is an integer variable entered by the user. If yes, write the line of code to do that.

Part III: Answer only one of the following two questions:**Q.4**

Write the recursion version of the following function:

```
int power(int x, int n)
{
    int p,i;
    p=1;
    for(i=1;i<=n;i++)
    {
        p=p*x;
    }
    return p;
}
```

Part IV: Answer the following question:**Q.5**

Identify the logical errors in the following bubble sort program.

```
#include <stdio.h>
#define SIZE    5
void main()
{
    int Ar[SIZE]= { 10, 7, 3, 5, 8};
    int i, j = 0;
    int Sorted = 0;
    int Temp;
    while(Sorted)
    {
```

```
Sorted = 1;
j++;
for (i=0; i < SIZE; i++)
{
    if (Ar[i] > Ar[i+1])
    {
        Temp = Ar[i];
        Ar[i+1] = Temp;
        Ar[i] = Ar[i+1];
        Sorted = 0;
    }
}
for (i=0; i < SIZE; i++)
{
    printf("%d\t", Ar[i]);
}
}
```

.....

Part V: Answer the following question:

Q.6 Describe the output of the following program:

```
#include <iostream.h>
#include <conio.h>
#include <string.h>
#include <dos.h>

int main(void)
{
    char str[30]="Hello World";
    int Row, Col, PreCol;
    int Len;
    int Delta = 1;

    Row = 10; Col = 11; PreCol = 1;
    Len = strlen(str);
    clrscr();

    while(kbhit() == NULL)
    {
        gotoxy(PreCol, Row);
        cout << "          ";
        gotoxy(Col, Row);
        cout << str;
        PreCol = Col;
        Col += Delta;
        if (Delta > 0 && Col+Len > 80)
```

```
        {
            Delta *= -1;
            Col += Delta;
        }
    else if(Delta < 0 && Col-Len < 0)
    {
        Delta *= -1;
        Col += Delta;
    }
    delay(1000);
}

return 0;
}
```

Note: - *delay(1000)* function pauses the program for 1000 ms (1 second)
- *kbhit()* function to check if keystroke is happened.

Good luck and best wishes