ITEC114
Structured Programming
Midterm Exam, Spring 2016/2017
12 April 2017

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Student Name: _____

Student Number: _____

Group No: _____

Question	Points	Score
Part1	20	
Part2	25	
Part3	20	
Part4	35	
Total	100	

Duration of the exam is 75 minutes

Ask if any question in first 30 minutes

You are not allowed to leave the class within first 30 minutes

Part1 - Multiple Choice (2 each)

1) What is the output of the program?

```
#include "stdafx.h"
void main( )
{
 int i=12, z=8;
 if(i=5 && z>50)
 printf("bye");
 else
 printf("hello");
 printf("bye");
}
```

A) none   B) hello
C) bye   **D) hello and bye**

2) What is the output of the program?

```
#include "stdafx.h"
void main( )
{
   int x = 9, y, z;
 y = x++;
 z = x++;
 printf("%3d",y++);
 printf("%3d",z);
}
```

A) 9 10   B) 11 9
C) 9 9   D) 9   11

3) What is the output of the program?

```
#include "stdafx.h"
void main()
{
        int x [6]= {0,0,10,20,30};
      printf (" \n %d %d %d %d %d %d", x[5], x[4] ,x[3] ,x[2] ,x[1] ,x[0] );
}
```

A) 30 20 10 0 0 0   B) 0 0 0 10 20 30
C) 0 30 20 10 0 0   D) 0 0 30 20 10 0

4) What is the output of the program?

```
#include "stdafx.h"
void main()
{
        int a= 1;
  if(!a)
     a++;
  printf("a=%d",a++);
}
```

A) 1   B) 2
C) 3   D) none

5) What is the output of the program?

```
#include "stdafx.h"
void compare (int a)
{

        if (!0)
                printf("%d > %d\n", (a+2), a);
        else
                printf("%d > %d\n", (a+1), a);
}

void main () {
        compare(1);

}
```

A) 2 > 1   B) 3 > 1
C) 1 <= 2   D) 3 <= 2

6) What is the output of the program?

```
#include "stdafx.h"
void main() {
  int i;
  for (i = 0; i <=10; i++);
    {
      printf("i = %d\n", i);
    }
}
```

A) 11   B) 0
C) syntax error   D) none

7) In C, if you pass an array as an argument to a function, what actually gets passed?

    A. Value of elements in array

    B. Address of the first element of array

    C. First element of the array

    D. Address of the last element of array

8) What will be the output of the program ?

```
void main()
{
    int a[5] = {5, 1, 3, 4, 7};
    int i, j, m;
    i = --a[3];
    j = a[3]++;
    m = a[i];
    printf("%d, %d, %d", i, j, m);
}
```

A. 4, 4, 3   B. 3, 4, 3   **C. 3, 3, 4**   D. 3, 4, 4

9) Which of the following is a complete function?

    A. int funct();

    B. int funct(int x) {return x=x+1;}

    C. void funct(int) { printf("Hello");

    D. void funct(x) { printf("Hello"); }

10) What will be the output of the program ?

```
#include "stdafx.h"
int sq(int);
void main(){
    int a=1,x;
    x=sq(a++);
    printf("%d",x);
}
int sq(int num){
    return num*num;
}
```

A. 1   B. 4   C. 3   D. 2

Part2

1) What values are printed out by the following C program? **(12.5 p.)**

```
#include "stdafx.h"
int confusion(int x, int y)
{
    x = 2 * (x++) + y;
    return x;
}
void main()
{
    int x = 2, y = 5;
    y = confusion(y, x);
    x = confusion(y, x);
    printf("%d %d\n", x, y);
}
```

OUTPUT				
Main		**Func**		
x	**y**	**x**	**y**	**output**
2	**5**	**5**	**2**	**29 13**
	13	**13**		
29		**13**	**2**	
		29		

2) What will be the output of the program? **(12.5 p.)**

```
#include "stdafx.h"
int fun(int);
void main()
{
    int i = fun(5);
    printf("%d\n", i--);
}

int fun(int i)
{
    return ++i;
}
```

OUTPUT		
main	**func**	**o/p**
i	**i**	
5	**5**	**6**
6	**6**	
5 (after print)		

Part3 - (20 p.)

1) Write needed statements for the followings:

a) Write a function called menu which prints the text string "Menu choices". The function does not pass any data back, and does not accept any data as parameters.

```
void menu( void )
{
        printf("Menu choices");
}
```

b) Write a function prototype for the above function.

```
void menu( void );
```

c) Write a function called total, which totals the sum of an integer array passed to it (as the first parameter) and returns the total of all the elements as an integer. Let the second parameter to the function be an integer which contains the number of elements of the array.

```
int total( int array[], int elements )
{
        int loop, sum;

        for( loop = 0, sum = 0; loop < elements; loop++ )
                sum += array[loop];
        return sum;
}
```

d) Write a function prototype for the above function.

```
int total( int [], int );
```

Part4

1) Write a C program with a function called **getRandom()** which will generate 10 random numbers and return them using an array and print them in main() as follows: **(15 p.)**

```c
#include "stdafx.h"
#include "stdlib.h"
#include "time.h"
int  getRandom( )
{
   int i,rnum;

   rnum= rand()%10;
   return  rnum;
}

void main ()
{

   int  r[10];
   int i;
   srand(time( NULL ) );

   for ( i = 0; i < 10; i++ )
   {
        r[i]=getRandom();
      printf( "p[%d] : %d\n", i, r[i]);
   }

}
```

2) Write a program to find the smallest number in an array using pointer. The output should be same as the following. **(20 p.)**


```c
#include "stdafx.h"
 void main()
{
int min, a[5],i,*p;
p=a;
printf("enter 5 elements : ");
for(i=0;i<5;i++)
scanf("%d",(p+i));
min=*p;
for(i=0;i<5;i++)
{
if(min>*(p+i))
min=*(p+i);
}
printf("\nSmallest element: %d\n\n",min);
}
```