

ESC101: Fundamentals of Computing(Major Quiz 1)

Version A

28th January, 2014

Instructions

1. Read these instructions carefully.
2. Write you name, section and roll number on all the pages of the answer book.
3. Write the answers cleanly in the space provided.
There is space left on the back of the answer book for rough work.
4. Do not exchange question books or change the seat after obtaining question paper.
5. Using pens (blue/black ink) and not pencils.
Do not use red pens for answering.
6. Even if no answers are written, the answer book has to be returned back with name and roll number written.

Question	Points	Score
1	6	
2	5	
3	8	
Total:	19	

Helpful hints

1. The questions are *not* arranged according to the increasing order of difficulty. Do a quick first round where you answer the easy ones and leave the difficult ones of the subsequent rounds.
2. For fill in the blanks type of questions, read the comments in the code. They usually have helpful remarks.

Name:

Section:

Rollno:

Question 1. (6 points) Consider the following two C program (Program A and Program B).

```

1 #include <stdio.h>
2
3 int main(){
4     int x1, x2, x3;
5     printf("Enter three numbers:\n");
6     scanf("%d", &x1);
7     scanf("%d", &x2);
8     scanf("%d", &x3);
9     if (x1 > x2) {
10         x1 = x2 - x1;
11         x2 = x2 - x1;
12         x1 = x1 + x2;
13     }
14     if (x2 > x3) {
15         x2 = x3 - x2;
16         x3 = x3 - x2;
17         x2 = x2 + x3;
18     }
19     if (x1 > x2) {
20         x1 = x2 - x1;
21         x2 = x2 - x1;
22         x1 = x1 + x2;
23     }
24     printf("%d %d %d\n", x1, x2, x3);
25     return 0;
26 }

```

Program A

```

1 #include <stdio.h>
2
3 void my_swap(int a, int b);
4
5 void my_swap(int a, int b){
6     a = b - a;
7     b = b - a;
8     a = a + b;
9 }
10
11 int main(){
12     int x1, x2, x3;
13     printf("Enter three numbers:\n");
14     scanf("%d", &x1);
15     scanf("%d", &x2);
16     scanf("%d", &x3);
17     if (x1 > x2)
18         my_swap(x1, x2);
19     if (x2 > x3)
20         my_swap(x2, x3);
21     if (x1 > x2)
22         my_swap(x1, x2);
23
24     printf("%d %d %d\n", x1, x2, x3);
25     return 0;
26 }

```

Program B

Fill the table given below with the output of the two programs for the given values of x₁, x₂, x₃.

Solution:

x ₁	x ₂	x ₃	Output of Program A	Output of Program B
1	3	6	1 3 6	1 3 6
6	1	3	1 3 6	6 1 3
3	6	1	1 3 6	3 6 1

Name:

Section:

Rollno:

Question 2. (5 points) Consider the program given below.

```
1 #include <stdio.h>
2
3 int main(){
4     int i, n, k, sum;
5     scanf("%d", &n);
6     scanf("%d", &k);
7
8     i = 0;
9     sum = 0;
10
11     while(i<n){
12         if(k%2 != 0){
13             sum = sum + k;
14             i=i+1;
15         }
16         k = k+1;
17     }
18
19     printf("%d", sum);
20
21     return 0;
22 }
```

What is the output of the program when

1. n = 4 and k = 5

Answer:

2. n = 21 and k = 8

Answer:

Solution:

1. 32
2. 609

Name:

Section:

Rollno:

Question 3. (8 points) The program given below is a partially filled program that computes the *median* of three numbers given as input **a_1**, **a_2** and **a_3**, and displays the answer.

For example, if **a_1=6**, **a_2=2** and **a_3=1** , then output is **Median is 2**.

Fill in the missing blanks and complete the program. Note that there are a total of **8 blanks** that you need to fill.

(Hint: Read the comments to get some help.)

```
1 #include <stdio.h>
2 int min(int a, int b);
3 int max(int a, int b);
4
5 int min(int a, int b){    //Computes minimum of its arguments
6
7     if(_____) return a;
8     else return b;
9 }
10
11 int max(int a, int b){    //Computes maximum of its arguments
12
13     if(_____) return b;
14     else return a;
15 }
16
17 int main(){
18     int a1, a2, a3;
19
20     printf("Enter the numbers: ");
21     scanf("%d", &a1);
22     scanf("%d", &a2);
23     scanf("%d", &a3);
24
25     if(min(a1,a2) == a2){
26
27         if(min(a1,a3) == _____)
28             printf("Median is %d\n", a1);
29         else
30
31             printf("Median is %d\n", max(_____,_____));
32     }
33     else{
34         if(max(a1,a3) == a1)
35
36             printf("Median is %d\n", _____);
37         else
38
39             printf("Median is %d\n", min(_____,_____));
40     }
41     return 0;
42 }
```

Solution:

```
1 #include <stdio.h>
2 int min(int a, int b);
3 int max(int a, int b);
4
5 int min(int a, int b){    //Computes minimum of its arguments
6     if(a<b) return a;
7     else return b;
8 }
9
10 int max(int a, int b){    //Computes maximum of its arguments
11     if(a<b) return b;
12     else return a;
13 }
14
15 int main(){
16     int a1, a2, a3;
17
18     printf("Enter the numbers: ");
19     scanf("%d", &a1);
20     scanf("%d", &a2);
21     scanf("%d", &a3);
22
23     if(min(a1,a2) == a2){
24         if(min(a1,a3) == a1)
25             printf("Median is %d\n", a1);
26         else
27             printf("Median is %d\n", max(a2,a3));
28     }
29     else{
30         if(max(a1,a3) == a1)
31             printf("Median is %d\n", a1);
32         else
33             printf("Median is %d\n", min(a2,a3));
34     }
35     return 0;
36 }
```