Total Points 19 Pages: 5

ESC101: Fundamentals of Computing(Major Quiz 1) Version B

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.

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.

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

Name: Section: Rollno:

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

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

Program A Program B

Fill the table given below with the output of the two programs for the given values of x_1, x_2, x_3.

Solution:				
x_1	x_2	x_3	Output of Program A	Output of Program B
1	3	6	1 3 6	6 3 1
6	1	3	6 1 3	6 3 1
3	6	1	3 6 1	6 3 1

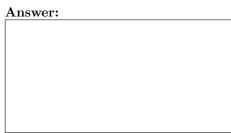
Name: Section: Rollno:

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

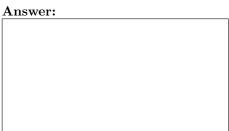
```
1 #include <stdio.h>
3
  int main(){
    int i, n, k, sum;
    scanf("%d", &n);
    scanf("%d", &k);
6
8
    i = 0;
9
    sum = 0;
10
    while(i<n){
11
      if(k\%2 == 0){
12
         sum = sum + k;
13
         i=i+1;
14
      }
15
      k = k+1;
16
    }
17
18
    printf("%d", sum);
19
20
21
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

What is the output of the program when

1. n = 4 and k = 5



2. n = 21 and k = 8



Solution:

- 1. 36
- 2. 588

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

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