Indian Institute of Technology, Kharagpur

Department of Computer Science and Engineering

Class Test 1 (Solution), Autumn 2016-17

Programming and Data Structure (CS 11001 / CS 10001)

Students: 681 **Date**: 25-Aug-16

Full marks: 20 **Time**: 7:00pm–8:00pm

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1. (5 marks) Write C statements (corresponding to a program segment) for the following:
   (a) Declare a variable x of type `float` and initialize it to 2000.
   (b) Declare a and b of type `int`.
   (c) Read a and b from the user.
   (d) Compute a divided by b with proper type cast so that no information is lost, and store the result in x.
   (e) Print the value of x.

(a)

```
float x=2000;
```

(b)

```
int a,b;
or
int a;
int b;
```

(c)

```
scanf("%d %d\n",&a,&b);
```

(d)

```
x=(float)a/b;
or
x=(a*1.0)/b;
or
x=a/(b*1.0);
```

(e)

```
printf("%f",x);
```

2. (10 marks) What will be printed when the following program statements / segments will execute?

(a)

```
int x;
float y, z;
x = 10/3;
y = x/3;
z = x+y;
printf ("y = %f, z=%f", y, z) ;
```

$y = 1.000000$, z=4.000000

(b)

```
#define CALC(X) (X*X)
int main() {
    int a, b=5;
    a = CALC(b+2);
    printf("\n a= %d b=%d", a,b);
}
```

a= 17 b=5

(c)

```
int a=10;
if(a>=5)
  a=a+3;
  else
  a=a+2;
  printf("\n a=%d ",a);
```

a=13

(d)

```
int a=10, b=-4;
if(a=5)
  b=a+b;
  else
  b=a-b;
  printf("\n a=%d  b=%d",a, b);
```

a=5 b=1

(e)

```
int i,a[10];
a[0]=0;
for (i=1; i<10; i++)
  a[i]=a[i-1]+i;
  printf("\n val1=%d  val2=%d",a[4], a[9]);
```

$val1$=10 $val2$=45

3. (5 marks) An integer is a perfect square if its square root is also an integer. Write a full program in C to print all the **odd perfect squares** between 1 and N, where N is read from the user.

```
#include <stdio.h>

int main()
{
        int i,N,square;

        printf("Enter the value of N: ");
        /* Read the value of N */
        scanf("%d",&N);

        printf("The perfect squares between 1 and %d are.\n",N);
        /* Sqrt atmost will vary till N */
        for(i=1;i<=N;i++) {
                /* Only the square of odd number can be odd number. */
                if(i%2==1) {
                        square=i*i;
                        if(square>N) {
                                /* Range exceeds ... break */
                                break;
                        } else{
                                /* Print odd perfect square */
                                printf("%d\n",square);
                        }
                }
        }
        return 0;
}
```