King Fahd University of Petroleum and Minerals
Information and Computer Science Department
ICS 103: Computer Programming in C
Spring Semester 2007-2008 (Term-072)
Major Exam-I

Time:100 minutes **Saturday, March 22, 2007**

Name:	
ID#:	

PLEASE CIRCLE YOUR SECTION BELOW:

Section	01	02	03	04	05	06
Time	SM-8-9	SM 9-10	SM 11-12	UT 10-11	UT 11:12	UT 10-11

Note:

- **Copying or Discussion will result in zero grade for all the students involved.**
- **Attempt all questions.**

Question #	Maximum Marks	Obtained Marks
1	16x1.5=24	
2	6	
3	6	
4	6	
5	10	
6	8	
7	6	
8	16	
9	18	
Total	100	

Question 1: (24 points 1.5 each expression)

Find the values of the following expressions.

expression	Value
5>6-2	1
1!=1<=1	0
10<=7<=5	1
7<10<=10-5	1
1||!1&&0	1
6!=3!=1	0
-8<-4<0	0
(double)(9/2)	4.0
3*4-6/2.0	9.0
-4+4*3%5	-2
3%5*5	15
21/6*6.0	18.0
11+1/2.0	11.5
10/(int)2.5	5
3-2||1==2%3	1
!3<3+1&&0<2-2	0

Question 2 (6 points)
What is the output of the following program?

```
#include <stdio.h>
int main(void) {
int x,y,z;
x=20;z=30;
if(0<=x<=10)
  printf("in\n");
else
  printf("out\n");
if( x=10)
  z=40;
else
  z=10;
printf("%d,%d",x,z);
return 0;
}
```

```
in
10,40
```

Question 3 (6 points)

Find the equivalent expression on each side

expression	Equivalent expression without brackets
!(!a||!b)	a && b
!(a>d && !(a>c))	a<=d || a>c
!(a!=b && c<=d)	a==b || c > d

Question 4 (6 points)

What will be the values of x, y, and z after executing the following statements.

```
int x=-9.666;
double y=x;
double z=x/3;
```

x	y	z
-9	-9.0	-3.0

Question 5 (10 points)

What is the output of the following program

```
#include <stdio.h>
int main() {
int x;
printf("Enter a value for x >");
scanf("%d",&x);
if(x > 5 ) {
  if(x< 10){
    if(x>=8)
       printf("A");
    else
       printf("B");
  }
  else{
    if ( x >= 0)
      printf("C");
    else
      printf("D");
  }
}
else
 printf("E");
return 0;
}
```

Value of x typed By user	Program output
3	E
7	B
9	A
10	C
-2	E

Question 6 (8 points)

Consider the following program. What will be the output for the different values of x typed by the user.

```
#include <stdio.h>
int main() {
int x;
printf("Enter a value for x >");
scanf("%d", &x);
switch(x) {
  case 6: x=x+2;
  case 5: x=x-1;
       if(x==4)
         break;
  case 3: x=x-2;

          break;
  case 2: x=x-1;
  default : x=10;
  }
  printf("%d\n",x);
return 0;}
```

Value of x typed By user	Program output
6	**5**
5	**4**
3	**1**
2	**10**

Question 7 (6 points)

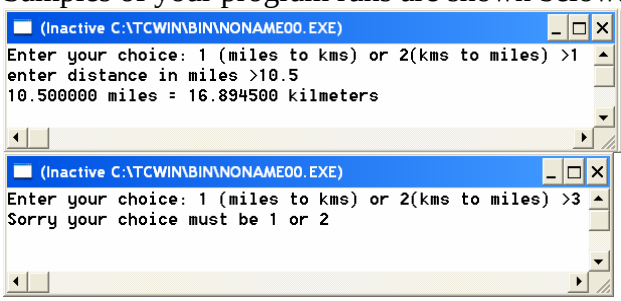
Given the following program. Write 2 printf statements to have the output shown below the program. Each square represents one space.

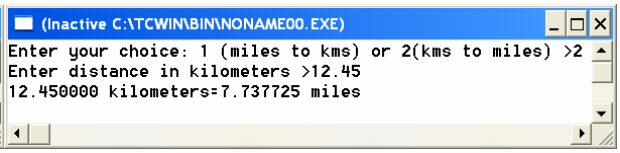
```
#include <stdio.h>
int main(void) {
double z= 623.782;
int i=917;

printf("%4d%7.1f\n",i,z);
printf("%10.4f%6d",z,i);

return 0;
}
```

	9	**1**	**7**			**6**	**2**	**3**	**.**	**8**					
		6	**2**	**3**	**.**	**7**	**8**	**2**	**0**				**9**	**1**	**7**

Question 8 (16 points)

Write a program that converts a distance from miles to kilometers or from kilometers to miles. Your program should give two options to the user.
If the user types 1, then the program will ask for a distance in miles and converts it to kilometers.
If the user types 2, then the program will ask for a distance in kilometers and converts it to miles.
If the user types another number, the program will display an error message.
1 mile=1.609 kms. The conversion factor from mile to kilometer needs to be declared as a constant.
Use switch statement.
Samples of your program runs are shown below:






```
#include <stdio.h>
#define KMS_PER_MILE 1.609
int main() {
int choice;
double kms, miles;
printf("Enter your choice: 1 (miles to kms) or 2(kms to miles) >");
scanf("%d",&choice);
switch(choice){
case 1: printf("enter distance in miles >");
        scanf("%lf",&miles);
        kms=miles*KMS_PER_MILE;
        printf("%f miles = %f kilmeters",miles,kms);
        break;
case 2: printf("Enter distance in kilometers >");
        scanf("%lf",&kms);
        miles=kms/KMS_PER_MILE;
        printf("%f kilometers=%f miles",kms,miles);
        break;
default: printf("Sorry your choice must be 1 or 2");
}
return 0;
}
```

Question 9 (18 points)

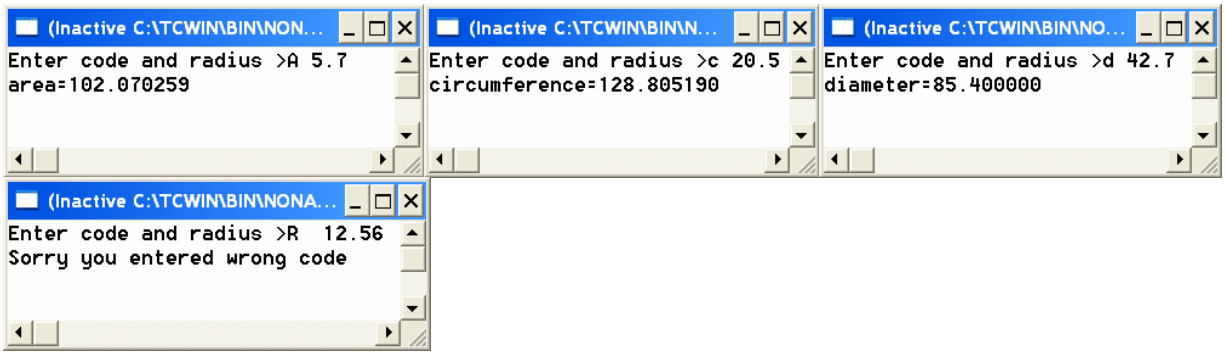
Write a program that asks the user for a code character and a radius. The code character can be:
A or a to compute and display the area of the circle
C or c to compute and display the circumference of the circle
D or d to compute and display the diameter of the circle

$area = \pi r^2$

$circumference = 2\pi r$

$diameter = 2r$

Use if-else-if statement




```
#include <stdio.h>
#define PI 3.14159
int main() {
double radius,diameter,area,circum;
char choice;
printf("Enter code and radius >");
scanf("%c%lf",&choice,&radius);
if(choice == 'A' || choice == 'a') {
  area=PI*radius*radius;
  printf("area=%f",area); }
else if(choice == 'C' || choice == 'c') {
  circum=2*PI*radius;
  printf("circumference=%f",circum); }
else if (choice=='D' || choice == 'd') {
  diameter=2*radius;
  printf("diameter=%f",diameter);
}
else
 printf("Sorry you entered wrong code");
return 0;
}
```