CSE 220 – Programming in C
Quiz #1
Spring 2016

Name: _____

Section:_____

1. What is the output of the following C programs? (24 pts)

Program A

```
#include <stdio.h>
int main() {
     int x = 3;
     int y = x << 1;
     if (y > 5)
          printf("You win");
     else
          printf("You lose");

     return 0;
}
```

You win

Explanation:

x = 3, in binary: x = 11

Bitwise shift left one position: y = 110 which is 6 and is greater than 5

Program B

```
#include <stdio.h>
int main() {
     int x = 5, y = 2;
     y *= x++;                                   //A
     float z = ++x + y++ - (x && y) ;            //B
     printf("%.2f, %d, %d", z, x, y);            //C
     return 0;
}
```

```
A:   y = y * 5 = 10 and x = x + 1 = 6;
B:   z = (++x) + (y++) - (x && y)
          x is incremented first, becomes 7
          y is incremented after z is computed, becomes 11
     z = 7 + 10 - (7 && 10) = 7 + 10 - 1 = 16
```

Output:

16.00, 7, 11

Program C

```
#include <stdio.h>
int main(){
    float x;
    int a = 4, b = 7;
    x = a ? a + b : a - b;
    printf("%.4f", x);
    return 0;
}
```

a is non zero so x = a + b = 11
Output: 11.0000

Program D

```
#include <stdio.h>
int main() {
     int i = -4;
     while (i < 0) {
          i++;
          printf("%d\n", i);
     }

     return 0;
}
```

-3
-2
-1
0

2. Write a loop to print integers between 20 and 50 counting by 3. The output should be as follows: 20 23 26 29 … 47 50 (15pts):

```
int x;
for (x=20; x<=50; x += 3)
    printf("%d ", x);
```

3. Complete the program below so it outputs the middle value among variables value1, value2, and value3. (15 pts)

```
#include <stdio.h>

int main(){

     float value1, value2, value3;


     printf("Enter three numbers:\n");


     scanf("%f %f %f", &value1, &value2, &value3);


     if ((value2 < value1 && value1 < value3) ||
          (value3 < value1 && value1 < value2))
          printf("The middle value is %d\n", value1);
     else if ((value1 < value2 && value2 < value3) ||
          (value3 < value2 && value2 < value1))
          printf("The middle value is %d\n", value2);
     else
          printf("The middle value is %d\n", value3);









     return 0;
}
```

4. The following program asks the user to enter 20 integers and prints out the largest one. There are a number of errors in the program. Fix 5 of them. (25 pts)

```
#include<stdio.h>

int main(void ) {

      int largest = -99999, number, tmpNumber;

      printf("Enter 20 numbers:\n");

      for (tmpNumber = 1; tmpNumber <= 20; tmpNumber++) {

            scanf("%d", &number);

            if (number > largest) {

                  largest = number;

            }

            total++;  //Not needed

      }

      printf("The largest is: %d\n", largest);

      return 0;

}
```

5. Write a program that reads a sentence from the user. The sentence ends when the user types one of the following punctuations: **. ? !**
The program should output the percentage of vowels (a, e, i, o, u) from the input up to 3 decimal digits, always showing the sign. (30 pts)

```
#include <stdio.h>
int main(void) {

        char letter;
        int vowel_count = 0, total_count = 0;

        printf("Enter a sentence( .!? to end) \n"");
        //start reading
        do {
                scanf("%c", &letter);
                if (letter == '.' || letter == '!' || letter == '?') {
                        break;          //exit the loop when punctuation reached
                } else  if (letter == 'a' || letter == 'e' || letter == 'i'
                        || letter == 'o' || letter == 'u') {
                        vowel_count++;
                }
                total_count++;
        } while (1);

        float percentage = (float)vowel_count / total_count;
        printf("Percentage of vowels: %+.3f\n", percentage);

        return 0;
}
```