Problem Set 5

1. Write a program to calculate the amount in bank every year with compound interest. User input should be principal, annual interest rate, and number of years. Formula for calculating the new amount is principal $* (1 + \text{rate})^{\text{nyears}}$.

2. Write a program to read a color from a user repeatedly, until user enters 0. In the end, print the number of times various colors have been entered by the user. Colors are denoted as R for red, B for blue, G for green. Ignore characters other than R, G, B, 0. For instance, for input RcBB\tBR0, the output should be red=2, blue=3, green=0.

3. What does the following program do?
```
main() { char *s="main() { char *s=%c%s%c; printf(s,34,s,34); }"; printf(s,34,s,34); }
```

4. Find errors in the following code segments and explain how to correct those.

```
(a) x = 1;
    while (x <= 10);
       ++x;
    }
```

```
(b) for (y = .1; y != 1.0; y += .1)
       printf("%f\n", y);
```

```
(c) // the following code should print values 1 to 10.
    n = 1;
    while (n < 10)
      printf("%d ", n++);
```

```
(d) for (x = 999; x >= 1; x += 2) {
       printf("%d\n", x);
    }
```

```
(e) counter = 2;
    Do {
      if (counter % 2 == 0) {
           printf("%u\n", counter);
      }
      counter += 2;
    } While (counter < 100)
```

```
(f) for (x = 100; x <= 150; ++x); {
       sum += x;
    }
```

5. Write programs to print the following sequence of values.
      (a) 3 8 13 18 23
      (b) 20 14 8 2 -4 -10
      (c) 19 27 34 40 45 49 52 54 55
      (d) 1 1 2 4 3 9 4 16 5 25

6. Run the program *cal* on the command line. What does it do? What does *cal 2016* do? Can you find out anything interesting in the year 1752? Implement *cal*.

7. Compute the following series upto 20 terms. The value of x should be taken as a user input.

$1 + 1/x + 1/x^2 + 1/x^3 + \ldots$

8. Write a program to print decimal to roman number chart upto decimal 1000 (roman M).

9. Write a program to convert (a) binary to decimal (b) ternary to decimal (c) decimal to binary.

10. Given input as a sequence of roll numbers, print how many students belong to various departments. Roll numbers would be of the form CE16B000, CS15M018, etc.