1. Write a C program that accepts a positive integer (from the keyboard) representing a time in seconds. If the input is invalid, it stops after printing the message **Invalid input**. For a valid input, it then computes and prints out the corresponding value in hours, minutes and seconds. If any component has zero value, then it is not printed (see the examples below). [8]

   (Example:
Input	Output
4000	4000 s = 1 h 6 m 40 s.
400	400 s = 6 m 40 s
45	45 s = 45 s
120	120 s = 2 m
3620	3620 s= 1 h 20 s)

2. The Bessel function of the first kind of order zero is defined by

$$J_0(x) = \sum_{n=0}^{\infty} \frac{(-1)^n}{(n!)^2} \left(\frac{x}{2}\right)^{2n} = 1 - \frac{x^2}{2^2(1!)^2} + \frac{x^4}{2^4(2!)^2} - \frac{x^6}{2^6(3!)^2} + \cdots$$

   Write a C program that accepts real x from the keyboard. Then it calculates and prints out the value of $J_0(x)$ using the first 20 terms only. [8]

3. Write a C program that accepts a three digit positive integer from the keyboard. If the input is invalid, it stops after printing the message **Invalid input**. For a valid input, it then checks whether the sum of the first and the last digits is equal to the middle digit. Finally, it prints appropriate message too. [6]

4. Rewrite the following code without **while** construct: [3]

```
int n,s;
n=1;
s=0;
while(n != 49)
{
n++;
s +=n;
n +=2;
}
```

5. Rewrite the following code without **for** construct:

```
int  s,i,j;
 for(s=0,i=1; i<7; i+=2)
    {
       for(s+=i, j=2*i; j<5; i++, j *=2)
          {
             s +=i;
          }
    }
     printf("s=%d\n",s);
```

What is the output of the code? [5]