Exercise Problems - 3

1. An year is called a leap year if it has 366 days. For an year to be a leap year, the year should be divisible by 4 and if the year is a multiple of 100, then it should be divisible by 400 also. An outline of a C program to take a number from the user and output whether the year with that number is a leap year or not.

```
#include<stdio.h>
int main()
{
   int year;
   printf("Give year \n");
   scanf("%d",&year);
   if(year % 100 == 0)
   {
      if (___________________)
      {
         printf("The year is a leap year \n");
      }
      else
      {
         printf("The year is not a leap year \n");
      }
   }
   else if(_________________)
   {
        printf("The year is a leap year \n");
   }
   else
   {
       printf("The year is not a leap year \n");
   }
   return 0;
}
```

2. An outline of a C program for taking two non-negative numbers a, b from user and giving the answer a^b is given below. Fill in the missing parts. Give memory state diagram after each step of execution, when the program is executed giving input:2 4.

```
#include<stdio.h>
int main()
{
      int a,b, pow,counter;
      printf("Give a \n");
      scanf("%d",&a);
      printf("Give b \n");
      scanf("%d",&b);
      pow = 1;
      counter = 0;
      while (counter < _________)
      {
          pow = pow * ___________;
          counter = counter + 1;
      }
      printf("result = %d \n", ________);
      return 0;
}
```

3. Fibonacci numbers are given by the sequence $1, 1, 2, 3, 5, 8, 13, \ldots$. Note that, from the third term onwards each term is the sum of the two terms just preceeding it. An outline of a C program to take a number n from the user as input and first n terms of this sequence is given below. Fill in the blanks. Give memory state diagram of your program after each step of execution, if n is entered as 6.

```
#include<stdio.h>
void main()
{
        int n,i,first,second,current;
        printf("Enter the number of terms to be displayed : \n");
        scanf("%d",&n);
        printf("The series is \n");
        first=0;
        second=0;
        current=1;
        i=0;
        while(i < __________)
        {
                printf("%d \n",current);
                first=second;
                second=_________________;
                current= _________________+_________________;
                i=i+1;
        }

}
```

4. Write a C program that takes a number n, followed by a set of n numbers from user and gives the maximum of this set of n numbers.

5. Write a C program that takes a number n, followed by a set of n numbers from user and gives the difference between the maximum and the minimum of this set of n numbers. Give memory state diagram of your program after each step of execution, if n is entered as 4 and the n numbers entered are 10 30 15 5.

6. (*) Suppose you want to write a program that takes a number n, followed by a set of n numbers from user and give this set of n numbers back to the user in reverse order. Can you write a program for this, using only the tools that we have learned so far?