*Experiment No. 4*

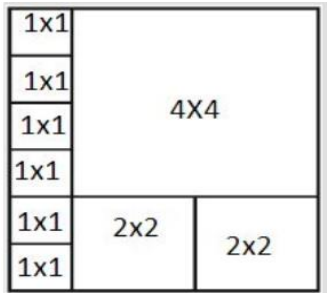
**Aim: Apply the concept of recursion to solve a given problem.**

**Common:**
**1.** Write a recursive function to find the factorial of a number and test it.
**2.** Write a recursive function which returns the nth term of the fibonacci series. Call it from main() to find the 1st n numbers of the fibonacci series.
**3.** Given a number n, print following a pattern without using any loop.
Example:
Input: n = 16
Output: 16, 11, 6, 1, -4, 1, 6, 11, 16
Input: n = 10
Output: 10, 5, 0, 5, 10
**4.** Ackerman's function is defined by:
A(m,n)=n+1 if m=0
=A(m-1,1) if m≠0 and n=0
=A(m-1, A(m,n-1)) if m≠0 and n≠0
Write a function which given m and n returns A(m,n). Tabulate the values of A(m,n) for all m in the range 1 to 3 and all n in the range 1 to 6.

**Batchwise Programs:**

**Batch 1:** Given a room of area L x B. You have infinite number of tiles of size $2^n$ x $2^n$ , where n = 0, 1,2,... so on. The task is to find the minimum number of square tiles required to fill the given area with tiles.

Examples:
Input : L = 5, B = 6.
Output : 9
Area of 5 X 6 can be covered with minimum 9 tiles.
6 tiles of 1 X 1, 2 tiles of 2 X 2, 1 tile of 4 X 4.




Input : L = 10, B = 5.

Output : 14

**Batch 2:** There are at least two sequences attributed to B. Recamán. One is the sequence $a_n$ formed by taking $a_1=1$ and letting

$a_n = a_{n-1} - n$ if $a_{n-1} - n > 0$ and is new

$= a_{n-1} + n$ otherwise

which can be succinctly defined as "subtract if you can, otherwise add."

The first few terms are

1, 3, 6, 2, 7, 13, 20, 12, 21, 11, ..so on.

**Batch 3:** Write a recursive function to return the minimum number of coins of given set of coin values that are required to produce a given amount. For example if you are given set of values {1,4,5}(indicating you had a supply of 1-cent,4-cent and 5-cent coins), and the amount 8, you should return 2, since the value 8 cents can be made with two 4-cent coins.

**Batch 4:** Write a program to find the value of y using recursive function, where $y=x^n$