5. Lab 5: Recursion

5.1. Objectives

Apply Recursion in pracitical mathematical problems.

5.2. Problems

5.3. Problem 1: Use the following function puzzle(..) to answer problems 1 - 3.

```
int puzzle(int base, int limit)
{       //base and limit are nonnegative numbers
        if ( base > limit )
                return -1;
        else if ( base == limit )
                return 1;
        else
                return base * puzzle(base + 1, limit);
}
```

1. (10 points) Identify the base case(s) of function puzzle(..)
2. (10 points) Identify the recursive case(s) of function puzzle(..)
3. (10 points) Show what would be displayed by the following calls.
    a. System.out.print(puzzle(14,10));
    b. System.out.print(puzzle(4,7));
    c. System.out.print(puzzle(0,0));

5.4. Problem 3: Write a recursive function that computes the sum of all numbers from 1 to n, where n is given as a parameter.

```
//return the sum 1+ 2+ 3+ ...+ n
int sum(int n)
```

5.5. Problem 5: Write a recursive function that computes and returns the sum of all elements in an array, where the array and its size are given as parameters.

```
//return the sum of all elements in a[]
int findsum(int a[], int n)
```

5.6. Problem 7: Write a recursive function that takes a string as input and reverses it using recursion.

5.7. Problem 8: Write a recursive function to generate all subsets of a given set.

5.8. Problem 11: Use recursion to generate a Von Koch snowflake

https://en.wikipedia.org/wiki/Koch_snowflake