

# Sort Files Alphabetically

Oliver works in the human resource department of an IT firm. There are 100 employees in his company. He has been asked to arrange personal details of all the employees in alphabetical order.



**How can he accomplish this task?**

**If you were to do this task, how would you do it?**

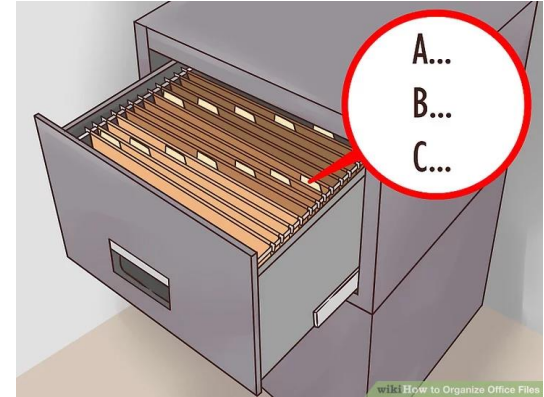
# Sort Files Alphabetically



**Place all files separately on a flat surface**



**Group files beginning with the same letter and arrange them alphabetically**



**Put all the files where you want them to be placed**

# Family Tree

Can you identify all the people in Oliver's family who have names beginning with the letter 'J'?



# Sorting Files and the Family Tree

**What is common between sorting files and the family tree?**

**What technique did we use to sort the files?**



# Sorting Files and the Family Tree

**Can we use a loop to solve this problem?**

Here we do not know how many times we need to loop.



# Sorting Files and the Family Tree

Will we encounter such problems in our journey as a Java programmer?

What do you think?



# Implementing Recursion



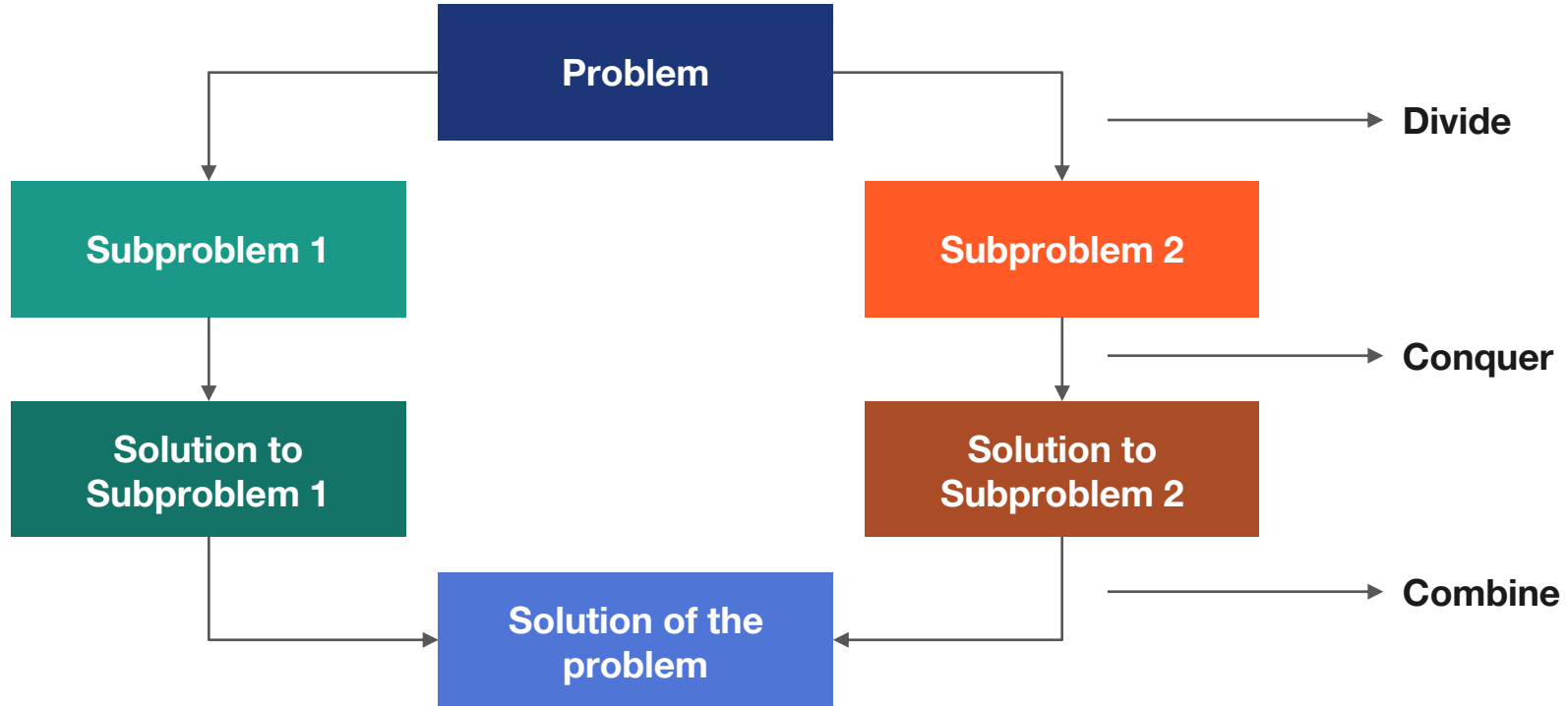
## Learning Objectives

- Define recursion
- Implement recursive functions
- Solve mathematical and programming problems using recursive functions





# What is Recursion ?

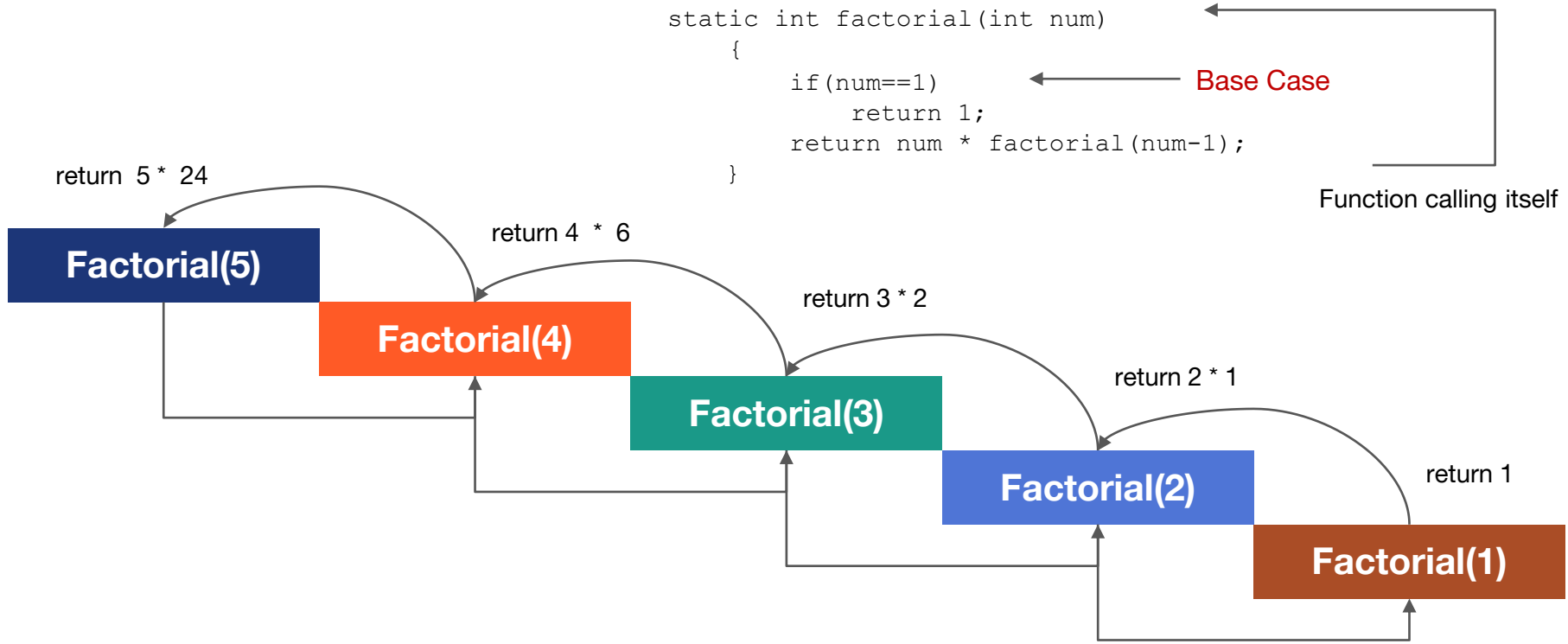


# Recursion Using Functions

```
static int factorial(int num)
{
    if(num==1)
        return 1;
    return num * factorial(num-1);
}
```

Base Case

Function calling itself



## Interactive Demo

Write a program to find the factorial of an integer.



# Applications of Recursion

Recursion is applied in mathematics and computer science

- In Mathematics
  - Solving permutation and combination problems
  - Finding multiples of a number
- In Programming
  - File management system

## Interactive Demo

Write a recursive function called `multiplyEvens` that returns the product of the given first “n” even integers.

For example,

`multiplyEvens(1)` returns 2

`multiplyEvens(4)` returns 384

$$2 * 4 * 6 * 8 = 384$$



## Key Takeaways

- Recursive functions
- Applications of Recursion
- Solve problems using a recursive approach.





Thank you!