



RECURSION

masai



RECURSION

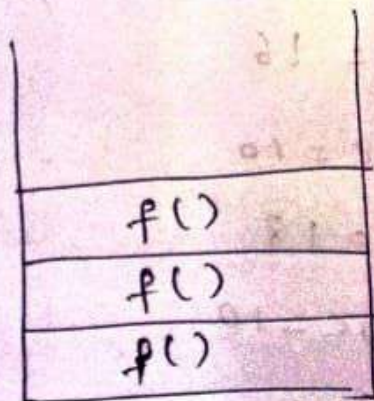
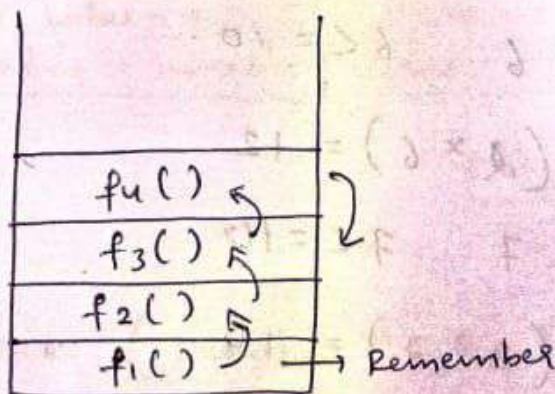
Recursion

① Functions

<return type> functionName (arguments)

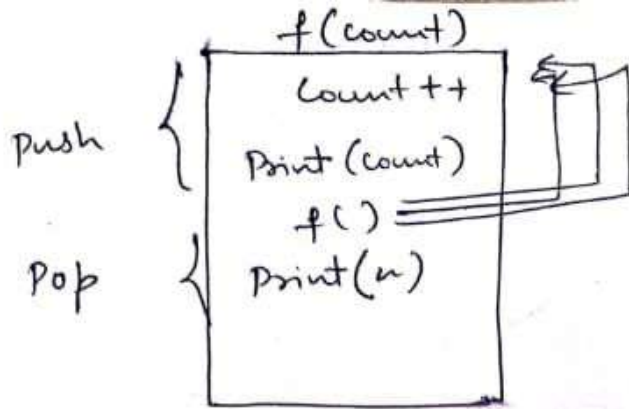
```
int getSum (int num1, int num2)
{
    int sum = 0;
    sum = num1 + num2;
    return sum;
}
```

② Stack Memory

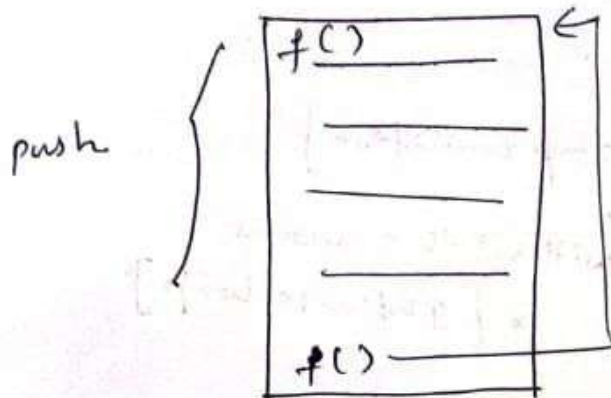


(*)

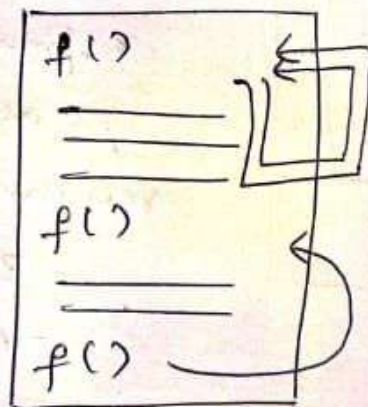
Same function it
is calling itself
Called Recursion



pattern 1



pattern 2



pattern 3

double recursion

③ why and where recursion is used

(a) Folder structure

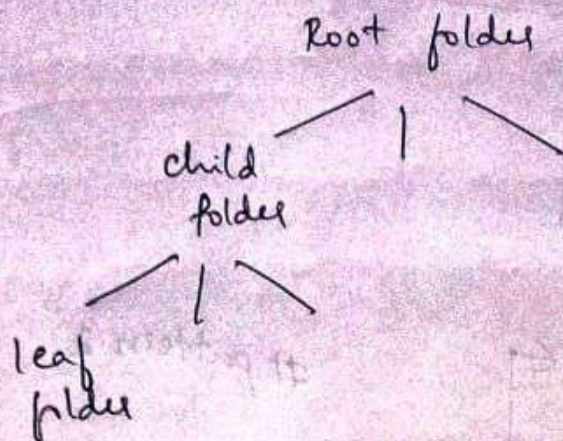
(b) Family tree

④ Important techniques to write recursive code

* Saves time

⑤ Common pitfalls of recursion

⇒

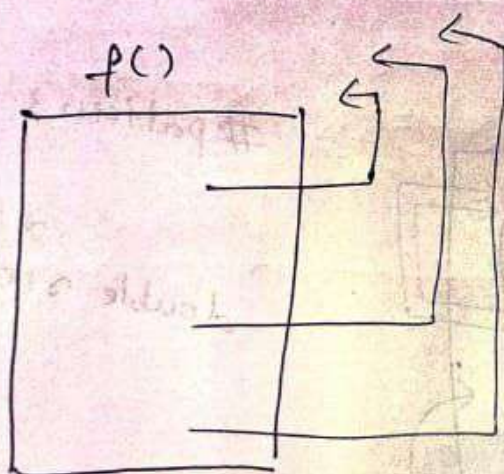


nothing [Break / stop condition]

without this means

* [Infinite loop]

⇒



* from where you are calling recursive function

- Beginning
- middle
- ending

⇒ Before you call the function recursively what is the code you write and after the recursion what you write.

⇒ will you call it one time (or) multiple times

Day16 >  Recursion.java > ...

```
1  public class Recursion {
2      public static void increment_and_print(int counter){
3
4          if (counter >= 10){ //the break or stop condition
5              //is mentioned here
6              return;
7          }
8          counter = counter + 1;
9          System.err.print(counter + " ");
10         increment_and_print(counter);
11     }
12
13     Run | Debug
14     public static void main(String[] args) {
15         increment_and_print(counter:0);
16     }
17 }
```

PROBLEMS OUTPUT TERMINAL ...

 Run: Recursion +   ... |  

```
PS C:\Users\ANANYA\OneDrive\Desktop\Algorithm365> & 'C:\Program Files\Eclipse Adoptium\jdk-21.0.6.7-hotspot\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp' 'C:\Users\ANANYA\AppData\Roaming\Code\User\workspaceStorage\015634db8fc5f9a2b840f9e82f267996\redhat.java\jdt_ws\Algorithm365_c0509dd3\bin' 'Recursion'
```

```
1 2 3 4 5 6 7 8 9 10
```

```
PS C:\Users\ANANYA\OneDrive\Desktop\Algorithm365>
```

Day16 >  Recursion.java >  Recursion

```
1  ∨ public class Recursion {
2  ∨     public static void increment_and_print(int counter){
3
4         counter = counter + 1;
5         System.err.print(counter + " ");
6
7         increment_and_print(counter);
8
9  ∨     if (counter >= 10){ //the break or stop condition
        is mentioned here
10         |     return; //continues loop
11         |
12     }
13
        Run | Debug
14  ∨     public static void main(String[] args) {
15         |     increment_and_print(counter:0);
16         | }
17     }
```

PROBLEMS OUTPUT TERMINAL ...

 Run: Recursion + ∨   ... |  

```
at Recursion.increment_and_print(Recursion.java:7)
at Recursion.increment_and_print(Recursion.java:7)
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Day16 > Recursion.java > Recursion

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3
4         if (counter >= 10){ //the break or stop condition
5             //is mentioned here
6             return;
7         }
8         counter = counter + 1;
9
10        increment_and_print(counter);
11
12        System.out.print(counter + " "); //The print
13        //statement is wrritten here
14    }
15    Run | Debug
16    public static void main(String[] args) {
17        increment_and_print(counter:0);
18    }
19 }
```

PROBLEMS OUTPUT TERMINAL ...

Run: Recursion + - [] [X] ... [] [X]

```
PS C:\Users\ANANYA\OneDrive\Desktop\Algorithm365> & 'C:\Program Files\Eclipse
Adoptium\jdk-21.0.6.7-hotspot\bin\java.exe' '-XX:+ShowCodeDetailsInExcept
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\bin' 'Recursion'
```

```
10 9 8 7 6 5 4 3 2 1
```

```
PS C:\Users\ANANYA\OneDrive\Desktop\Algorithm365>
```

Day16 >  Recursion.java >  Recursion

```
1  public class Recursion {
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                    wrritten here
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PROBLEMS OUTPUT TERMINAL ...

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```
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```

```
1 2 3 4 5 6 7 8 9 10 10 9 8 7 6 5 4 3 2 1
```

```
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```