Recursion

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Agenda

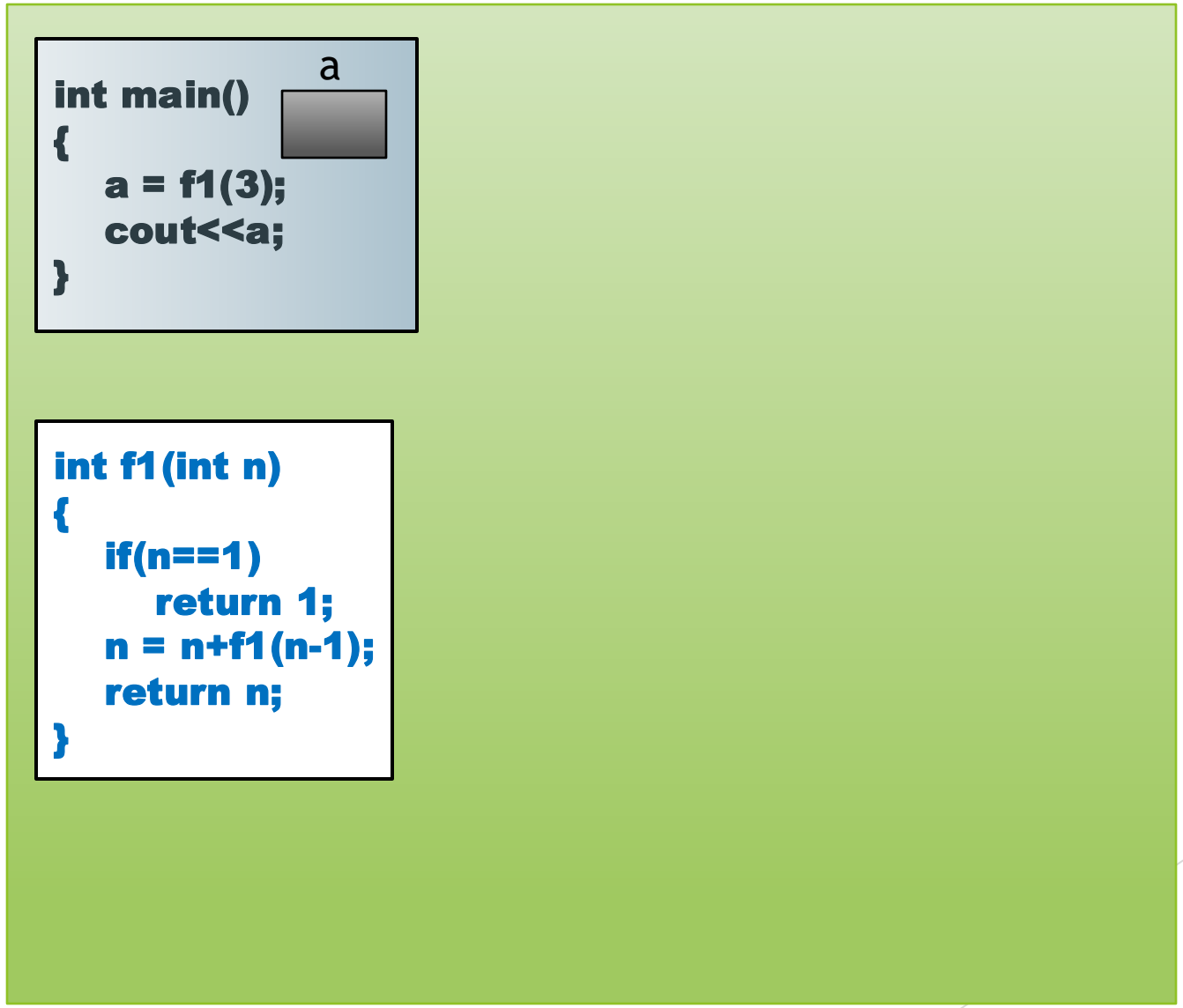
- Recursion
- Recursion Tree
- Approach to recursive solution

Recursion

- Function calling itself is called recursion
- A recursive method solves a problem by calling a copy of itself to work on a smaller problem
- It is important to ensure that the recursion terminates
- Recursive code is generally shorter and easier to write then iterative code

Recursion Tree

```
int main()
{
    int a;
    a = f1(3);
    cout<<a;
}
int f1(int n)
{
    if(n==1)
        return 1;
    n = n+f1(n-1);
    return n;
}
```



Approach to recursive solution

n = 5

1. F1(n) 1+2+3+4…….+n = 15
2. n+F1(n-1) 1+2+3+4…n-1 = 10+n
3. 1<=n

if (n==1)

return 1;

```
int F1(int n)
{
      if(n==1)
      {
            return 1;
      }
       return n+F1(n-1);
}
```

Write a C++ program to print first N natural numbers.

1. PrintN(n) 1 2 3 4 5……n;

2. PrintN(n-1) 1 2 3 4….n-1;

```
cout<<n;

If(n>=1)
    {
        PrintN(n-1)
        cout<<n;
    }
```