Recursion and the Stack

# Analysing the Factorial Function

## Return values

* Int f = factorial(5) = 120
* Int f = factorial(10 – 1) = 362880
* Int f = factorial(0) = 1

## Non-recursive Factorial Algorithm

static int NonRecursiveFactorial(int n)

{

if (n == 0)

{

return 1;

}

int output = 1;

for (int i = 1; i <= n; i++)

{

output \*= i;

}

return output;

}

Factorial will always successfully complete as the value that the answer is multiplied by is approaching 0. When it approaches 0, it returns a value of 1.

## Stack diagram

Push

Non-recursive base reached

Returns 1

Factorial(0)

Returns 6

And multiplies 4 \* 6

Push

Push

Push

Returns 2

Returns 1

Factorial(1)

Factorial(2)

Factorial(3)

Main()

Factorial(4)