**AP Computer Science - Recursive Examples**

**Example # 1**

**public** **class** XMethod {

**public** **static** **void** main(String[] args)

{

 System.*out*.println(*XMethod*(5));

}

**public** **static** **int** XMethod(**int** n)

{

 **if** (n==1) **return** 1;

 **else** **return** n + *XMethod*(n-1);

}

}

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Recursive Calls (Going In)** | **Returns** |  |  |  |
| **XMethod(5)** | **5 + XMethod(4)** |  | **XMethod(5)** | **5 + 10= 15** |
| **XMethod(4)** | **4 + XMethod(3)** |  | **XMethod(4)** | **4 + 6 = 10** |
| **XMethod(3)** | **3 + XMethod(2)** |  | **XMethod(3)** | **3 + 3 = 6** |
| **XMethod(2)** | **2 + XMethod(1)** |  | **XMethod(2)** | **2 + 1 = 3** |
| **XMethod(1)** | **Returns 1** |  | **XMethod(1)**  | **1** |

**What is the output of this program? XMethod(5) = 15**

Problem # 1

**public** **static** **void** main(String[] args) {

 Scanner s = **new** Scanner(System.*in*);

 System.*out*.println("Enter an index for a number in a series:");

 **int** index = s.nextInt();

 System.*out*.println("The number at index " + index + " is " + *f*(index));

 }

**public** **static** **long** f(**long** index)

{

 **if**(index==0) **return** 0;

 **else** **if** (index ==1) **return** 1;

 **else** **return** *f*(index-1) + *f* (index-2);

}

What is the output if the user enters 5 for index?

Problem # 2 - What is the output of this program?

**public** **class** Mystery {

 **public** **static** **void** main(String[] args) {

 *adjust*(4);

 }

**public** **static** **void** adjust(**int** n)

{

 **if** (n <=0) **return**;

 **for**(**int** i=0; i < n; i++) System.*out*.print("-");

 **for** (**int** i =0; i < n; i++) System.*out*.print("+");

 System.*out*.println();

 *adjust*(n-1);

 }

}

Problem # 3 - What is the output of this program?

**public** **class** Mystery {

 **public** **static** **void** main(String[] args) {

 *adjust*(4);

 }

**public** **static** **void** adjust(**int** n)

{

 **if** (n <=0) **return**;

 *adjust*(n-1);

 **for**(**int** i=0; i < n; i++) System.*out*.print("-");

 **for** (**int** i =0; i < n; i++) System.*out*.print("+");

 System.*out*.println();

 }

}