Virtual Lecture Notes (Part 1b)

Translating Piecewise functions into recursive methods is relatively straightforward, with some practice. For example, reconsider the expression shown here.

$$f(x) = \begin{cases} f(x-3)+2 & \text{if } x > 10 \\ \\ -5 & \text{if } x \le 10 \end{cases}$$

This function can be translated into Java code using the Six Simple Steps to Writing Recursive Methods and the following template.

```
public void nameOfRecursiveMethod( . . . )
{
     if(base case)
     {
          perform some action
     }
     else
     {
          perform some other action
          nameOfRecursiveMethod( . . . )
     }
}
```

First, familiarize yourself with the general features of the template. Remember, it is not yet a complete method, but a stub to be filled in with information specific to a function you want to convert to a recursive method. When you are ready to fill in the template, follow the instructions shown below.

Six Simple Steps to Writing Recursive Methods

1. Give the method a name.
2. Complete the parameter list in the method header.
3. Decide whether the method will be void or return something.
4. Write the base case condition.
5. Write the action to be taken if the base case is true.
6. Write the recursive call. The parameter list must match the method header.

Following these steps and using the template, the Piecewise function can be translated into the following recursive method.

```
public int fOf(int x)
{
     if(x <=10)
     {
          return -5;                  //the base case
     }
     else
     {
          return fOf(x – 3) + 2;      //recursive call
     }
}
```