Topics: Program design, trace

Reading (ML): -

Programming Rules of Thumb

• Learn *program patterns* of general utility and *use relevant pattern* for the problem at hand.

• *Seek inspiration* by systematically working test data by hand. Be introspective; ask yourself: “what am I doing?”

• *Declare variables* for each piece of information you maintain when working problem by hand. Write *comments* that precisely describe the contents of each variable.

• *Decompose* problem into manageable tasks.

• *Remember* the problem’s boundary conditions.

• *Validate* your program by tracing it on simple test data.

Program Trace

*Trace* the execution of the following program:

```plaintext
n=18;  x=3;  y=10;
while (n>0)
    if (mod(n,2)==0)
        n = n/2;
    else
        n = n-1;
        x = 10*x+3;
        y = y*10;
    end
end
y = (y-1)/3;
```

<table>
<thead>
<tr>
<th>n</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>3</td>
</tr>
<tr>
<td>y</td>
<td>10</td>
</tr>
</tbody>
</table>

*Example:*

Write a program that reads an input value in the range of 1 to 12 (integer only) to represent the month of the year. The program should assign to a variable *days* the integer number of days in that month and print the number of days to the screen. Assume a non-leap year. You must use a conditional statement in your program.