ACM Intercollegiate Programming Contest
Pacific NW Region
1999

Problem C
Function Run Fun

We all love recursion! Don't we?

Consider a three-parameter recursive function w(a, b, c):

```
if a <= 0 or b <= 0 or c <= 0, then w(a, b, c) returns:
      1

if a > 20 or b > 20 or c > 20, then w(a, b, c) returns:
      w(20, 20, 20)

if a < b and b < c, then w(a, b, c) returns:
      w(a, b, c-1) + w(a, b-1, c-1) - w(a, b-1, c)

otherwise it returns:
     w(a-1, b, c) + w(a-1, b-1, c) + w(a-1, b, c-1) - w(a-1, b-1, c-1)
```

This is an easy function to implement. The problem is, if implemented directly, for moderate values of a, b and c (for example, a = 15, b = 15, c = 15), the program takes hours to run because of the massive recursion.

Input
The input for your program will be a series of integer triples, one per line, until the end-of-file flag of -1 -1 -1. Using the above technique, you are to calculate w(a, b, c) efficiently and print the result. For example:

```
1 1 1
2 2 2
10 4 6
50 50 50
-1 7 18
-1 -1 -1
```

Output
Print the value for w(a,b,c) for each triple, like this:

```
w(1, 1, 1) = 2
w(2, 2, 2) = 4
w(10, 4, 6) = 523
w(50, 50, 50) = 1048576
w(-1, 7, 18) = 1
```

Note: Beware the dreaded run-time exceeded error!