Nested Loops

Last Time

- We
  - Introduced the **do/while** repetition structure
- Today we will
  - Examine the process of nesting repetition structures

Nested Loops

- A loop within a loop
- Can repeat multiple things within a loop
- Example: Read in 10 grades for each of 20 students
  - How would we write loops to do this?

What is the Output?

```
for (int i = 0; i < n; i++)
{
  for (int j = 0; j < i; j++)
    cout << "*";
  cout << endl;
}
```

What is the Output?

```
for (int i = m; i > 0; i--)
{
  for (int j = n; j > 0; j--)
    cout << "*";
  cout << endl;
}
```

What is the Output?

```
cout << setw(4) << "|";
for( int head = 0; head <= 10; head++ )
  cout << setw(3) << head;
cout << endl;

for( int i=0; i< 3*12+1; i++ )
  cout << "-";
cout << endl;

for( int row = 0; row <= 10; row ++ )
{
  cout << setw(3) << row << "|";
  for( int col = 0; col <= 10; col++ )
    cout << setw(3) << row * col;
  cout << endl;
}
```

Problem

- Write a program that outputs a rectangle of stars for any inputted width and height

Problem

- Write the nested 'for' loops that output the following:

```
    *
   * *
  * * *
 * * * *
* * * * *
```

Problem

- Write a program to play the stones game. There are 13 stones and 2 players alternate taking 1, 2 or 3 stones per turn. The winner is the player to remove the last stone. The program should print out (using *'s) a picture of how many stones are left each turn.

Notes on Previous Assignment

- Do not use magic constants
- Make sure to test your program well
  - Use data that are likely to cause problems
  - You can't test for everything but you can predict problematic input
- Write efficient code
  - Don't have superfluous selection or repetition structures
- Print out code, follow coding standards, submit complete documentation

Summary

- In today's lecture we covered
  - Nested Loops
- Readings
  - We have completed chapters 1 and 2