

## 21. Random Number Guessing Game Enhancement

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If the user enters 8, the program should display the following:

## 23. Pattern Displays

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## 20. Random Number Guessing Game

Enhance the program that you wrote for Programming Challenge 20 so it keeps a count of the number of guesses that the user makes. When the user correctly guesses the random number, the program should display the number of guesses.

## Nested Loops

**CONCEPT:** A loop that is inside another loop is called a *nested loop*.

A nested loop is a loop that appears inside another loop. A clock is a good example of something that works like a nested loop. The second hand, minute hand, and hour hand all spin around the face of the clock. The hour hand, however, only makes one revolution for every 12 of the minute hand's revolutions. And it takes 60 revolutions of the second hand for the minute hand to make one revolution. This means that for every complete revolution of the hour hand, the second hand has revolved 720 times.

Here is a program segment with a for loop that partially simulates a digital clock. It displays the seconds from 0 to 59:

```
cout << fixed << right;
cout.fill('0');
for (int seconds = 0; seconds < 60; seconds++)
    cout << setw(2) << seconds << endl;
```

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**NOTE:** The `fill` member function of `cout` changes the fill character, which is a space by default. In the program segment above, the `fill` function causes a zero to be printed in front of all single digit numbers.

We can add a minutes variable and nest the loop above inside another loop that cycles through 60 minutes:

```
cout << fixed << right;
cout.fill('0');
for (int minutes = 0; minutes < 60; minutes++)
{
    for (int seconds = 0; seconds < 60; seconds++)
    {
        cout << setw(2) << minutes << ":";
        cout << setw(2) << seconds << endl;
    }
}
```

nested loop

How many lines of output does this program segment produce?