Lesson 2.3 Nested Decisions

Another practical construction is *nested* **`if-else`** statements, when there are multiple *levels* of decisions that have to be made.

```
if ( Boolean expression )
{
    statement;
    if ( Boolean expression )
    {
        statement;
        statement;
    }
    else
    {
        statement;
    }
    statement;
}
else
{
    statement;
    statement;
}
statement;
```

Do this

Write a program that has the user enter their age, and print one of four responses, based on where their age falls: < 18, between 18 and 20 (inclusive), between 21 - 30, and > 30.

What some advice? Here's how *not* to do it:

Wrong Approach

```
Scanner in = new Scanner(System.in);
System.out.print("Enter your age: ");
double age = in.nextDouble();
if (age < 18)
    System.out.println("You can't vote yet...");
if (age >= 18 && age < 21)
    System.out.println("You can't buy alcohol yet...");
if (age >= 21 && age < 31)
    System.out.println("These are the best years of your life...");
if (age >= 31)
    System.out.println("No, THESE are the best years of your life!");
```

The reason this is the wrong approach is that it involves multiple individual comparisons which are both harder to maintain as a coder and require more processing power/time from the computer. Additionally, it's easier to make a mistake here: if one statement checks for **<21** and the other one checks for **>21**, you've forgotten to take care of the case where the value **== 21**.

A better approach is to use either a sequential series or a nested series of **if-else** statements to help organize the decision process.

Correct Approach

```
Scanner in = new Scanner(System.in);
System.out.print("Enter your age: ");
double age = in.nextDouble();
if (age < 18)
    System.out.println("You can't vote yet...");
else if (age < 21)
    System.out.println("You can't buy alcohol yet...");
else if (age <= 31)
    System.out.println("These are the best years of your life...");
else
    System.out.println("No, THESE are the best years of your life!");
```

Even better would be enclose these statement in curly braces:

```
Scanner in = new Scanner(System.in);
System.out.print("Enter your age: ");
double age = in.nextDouble();
if (age < 18)
{
    System.out.println("You can't vote yet...");
}
else if (age < 21)
{
    System.out.println("You can't buy alcohol yet...");
}
else if (age <= 31)
{
    System.out.println("These are the best years of your life...");
}
else
{
    System.out.println("No, THESE are the best years of your life!");
}
```

Exercise 11

GradeReporter

Write a program GradeReporter.java that has the user enter a grade percentage 0–100. The program then prints out the corresponding letter grade according to the following scale:

percentage >= 90 --> A
percentage >= 80 and < 90 --> B
percentage >= 70 and < 80 --> C
percentage >= 60 and < 70 --> D
percentage < 60 --> F

Please use if and else if structure for your decision making