AP Computer Science — Project 8 - Guessing
Dr. Paul Bailey — Monday, November 1, 2021

We will create a game which guesses a number between 1 and 100. The purpose of this project is to review the material from Savitch chapter 1 through 4. Create one directory called `P8_Guess` to store the `.java` files. Due Friday, November 5, 2019, before 11:59 PM. Put your name in a comment on the top of each program.

Program 1. Create a source file named `Guess0a.java`. Type in the following program which demonstrates the use of the standard library's `rand` function. Compile, run, and debug.

```
import java.util.Random;

public class Guess0a
{
    private static Random random = new Random();

    private static void play()
    {
        int n = random.nextInt(100) + 1;
        System.out.printf("I picked %d\n", n);
    }

    public static void main(String[] args)
    {
        play();
    }
}
```

Make sure that you understand what each line of code is doing.

Program 2. Copy `Guess0a.java` to `Guess0b.java` and modify it to the following program which demonstrates the use of the `while` statement. Compile, run, and debug.

```
import java.util.Random;
import java.util.Scanner;

public class Guess0b
{
    private static Random random = new Random();
    private static Scanner scanner = new Scanner(System.in);

    private static void play()
    {
        int n = random.nextInt(100) + 1;
        int k = 0;
        System.out.printf("I picked %d\n", n);
        while (++k <= 10)
        {
            int g = 0;
            System.out.printf("Guess: ");
            g = scanner.nextInt();
            System.out.printf("%2d) You guessed %d\n", k, g);
        }
    }

    public static void main(String[] args)
    {
        play();
    }
}
```

Again, study the program and make sure you understand what it is doing, and why it is doing it.

Program 3. Copy the `Guess0b.java` source file and rename it `Guess1.java`. Modify the program so that it becomes a guessing game as followings:

(a) The computer thinks of a number between one and one hundred.

(b) The human guesses a number.

(c) The computer tells the human if the guess is high or low and returns to **(b)**.

(d) If the guess is correct, the computer tells the human the guess is correct and stops.

Program 4. Create a program `Guess2.java` which is a guessing game in which the human writes a number between 1 and 100 on a piece of paper, and the computer guesses the number by a series of guesses. For each guess, the human tells the computer if it is high, low, or correct.

- Make the algorithm to be maximally efficient. That is, the computer can ALWAYS guess the number within seven guesses.
- Do not allow the human to lie. For example, if the human says 66 is too low by 67 is too high, print "You lie!", or some similar message, and exit the program.

Begin by typing, compiling, and debugging the code on the next page.

```
import java.util.Random;
import java.util.Scanner;

public class Guess2
{
    private static Scanner scanner = new Scanner(System.in);

    private static void help()
    {
        System.out.printf("Enter H for High\n");
        System.out.printf("      L for Low\n");
        System.out.printf("      C for Correct\n");
        System.out.printf("      Q to Quit\n");
    }

    private static void play()
    {
        String s = "";
        int a = 1;      // n >= a
        int b = 100;    // n <= b

        while (true)
        {
            char c = '@';
            int g = 1;
            // Set g to be a guess between a and b
            System.out.printf("Guess %d: ", g);
            s = scanner.next();
            c = (char)s.charAt(0);
            // If c is '?' help
            if (c == '?') help();
            // If c is 'Q' quit
            if (c == 'Q') break;
            // If c is 'C' say "You won!" and quit
            // If c is 'L' adjust a
            // If c is 'H' adjust b
        }
    }

    public static void main(String[] args)
    {
        System.out.printf("Select a number between 1 and 100.\n");
        help();
        play();
    }
}
```