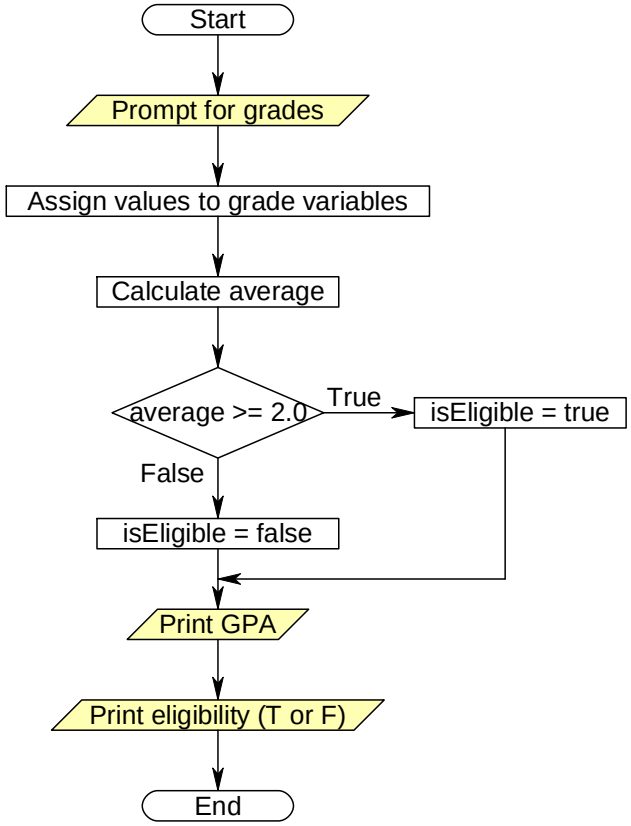
GPA_v1 Desk Check

The GPA_v1 class is a program designed to calculate the GPA of a student and determine eligibility to participate in extra curricular activities. A flowchart and corresponding pseudocode for the design of this program are shown below.



GPA_v1 Pseudocode

Prompt input of five numeric grades.
Assign grades to five integer variables.
Calculate the average grade.
Determine if average >= 2.0.
Print the GPA.
Print the eligibility status.

Examine the flowchart and pseudocode and compare them to the source code shown below.

```
<  1>   import java.util.Scanner;
<  2>   public class GPA_v1
<  3>   {
<  4>      public static void main(String[] args)
<  5>      {
<  6>         String studentName = "";
<  7>         Scanner in = new Scanner(System.in);
<  8>
<  9>         System.out.println("GPA Calculator");
<10>         System.out.println();
<11>         System.out.println("Please enter 5 grades separated by a space (e.g. 4 3 2 1 4): ");
<12>         int grade1 = in.nextInt();
<13>         int grade2 = in.nextInt();
<14>         int grade3 = in.nextInt();
<15>         int grade4 = in.nextInt();
<16>         int grade5 = in.nextInt();
<17>
<18>         double average = (grade1 + grade2 + grade3 + grade4 + grade5)/5.0;
<19>         boolean isEligible = average >= 2.0;
```

```
<20>
<21>            System.out.println("GPA: " + average);
<22>            System.out.println("Eligible: " + isEligible);
<23>        }//end of main method
<24>    }//end of class
```

Notice the overall organization of the GPA_v1 class, including the use of indentation and white space. Can you identify the sections that deal with input, processing, and output.

Study the following line-by-line analysis of the source code. Make sure you understand the purpose and syntax of each line in the program.

Line(s)
< 1> imports the Scanner class from the java.util package.
< 2> declares the name of the class.
< 3> opening curly brace indicating the beginning of the class.
< 4> declares the main method.
< 5> opening curly brace indicating the beginning of the main method.
< 6> declares a **`String`** variable for the student name.
< 7> creates a new object to use input methods of the **`Scanner`** class.
< 8> white space to improve readability.
< 9> prints a String literal.
<10> prints a blank line on the screen.
<11> prompts user to enter 5 grades in numeric format.
<12> assigns first token entered to grade1.
<13> assigns second token entered to grade2.
<14> assigns third token entered to grade3.
<15> assigns fourth token entered to grade4.
<16> assigns fifth token entered to grade5.
<17> white space to improve readability.
<18> calculates the average of the five grades.
<19> evaluates the boolean expression to determine if average is greater than or equal to 2.0.
<20> white space to improve readability.
<21> prints a String literal and the value of the average variable.
<22> prints a String literal and the value of the isEligible variable.
<23> curly brace indicating the end of the main method.
<24> curly brace indicating the end of the class.

Check Your Understanding

1. The user is prompted to enter five numeric grades, separated by spaces, in Line <11>. What causes each of the grades to be assigned to separate variables in Lines <12> through <16>?
2. In Line <18> why is arithmetic promotion used in the calculation? Are there any alternatives for dealing with this situation?