Sequential Flow

A computer executes one command in a program at a time (though very quickly). The computer will always start at the top of your program and proceed to the bottom of the program. We can show sequential flow using a flowchart drawn in SmartIdeas.

In a flowchart, each box will represent one action we need the computer to perform. In our class, when we want the computer to display some information on the monitor, we will use the word 'put'. When we want the computer to read something the user has typed on the keyboard, we will use the word 'get'. In a flowchart, arrows will show the order that the instructions are executed by the computer.

A Problem

Draw a flowchart for a program that will ask a person their age, and then display how old they will be next year. Using SmartIdeas, the solution is shown as:

```
put "Enter your age"

get age

newAge = age + 1

put "Next year your age will be", newAge
```

Notes:

1. The word 'put' will be used whenever we want the program to display something to the user (all lower case letters).
2. The word 'get' will be used whenever we want the program to read something the user has typed (all lower case letters).
3. Words that are to be displayed from the program will be enclosed in quotes.
4. A 'variable' is used to store information, such as a number, that may change (age and newAge are variables in the flowchart above).
5. Each rectangular box contains only one instruction.
6. Arrows indicate the flow from one box to another.
7. The computer will always start at the top and follow the arrows down to the last box.

Math operators/functions:

In the problem above we used addition, the following operations are also available.

```
+ addition
```
Switching to the "Outline" view of SmartIdeas, we see our instructions below, which we can use Edit on the menu to Select All and then use Copy.

Now start Turing, and Paste the instructions into the Turing editor. Once the instructions are pasted, press the Indent key, so your code looks as follows:

```
Main

- put 'Enter your age'
  - get age
  - newAge = age + 1
  - put "Next year your age will be", newAge
```

Now, we need to do a little bit of cleaning up, to create a fully functional computer program.

**Cleanup:**

1. Add Turing 'var' commands for each variable.
2. Variables may be one of the following:
   - string - holds any number of characters
   - int - holds positive or negative numbers without a decimal portion
   - real - holds positive or negative numbers that may have a decimal portion
3. Change the = sign to a := like below
Additional Problems

Create a flowchart, then a working program for each of the following. Save your flowchart and Turing programs in an appropriate folder.

1. Create a program that asks for the cost of an item, then outputs the cost of the item including tax. Tax is 15%.
2. Create a program that asks for the length and width of a room, then outputs the area of the floor.
3. Create a program that asks for your height in inches, then outputs your height in centimeters. The conversion is 1 inch = 2.54 cm.
4. Create a program that asks for the cost of a monitor, tower and printer. Output the total cost of the computer system and the cost of the system with taxes.
5. Create a program that asks for the hour a trip started, the hour the trip ended and the distance traveled. Output the average speed of the trip.