

Introduction to Programming in Turing

Output of Information

The IPO Model

The most basic model for a computer system is the Input-Processing-Output (IPO) Model.

In order to interact with the computer as a programmer, we must develop simple examples of each of these stages, which we will then build upon to solve more and more sophisticated problems.

Output

The most fundamental operation of a computer program is to communicate something useful to the end user.

We accomplish this with the concept of Output. Output is implemented in many ways depending upon the programming language.

For example: `put`, `print`, `printf`, `puts`, `println`

Using the "put" Command

In the Turing programming language, output is accomplished using the “put” command.

To start, we will consider outputting the most basic types of data – strings (which are groups of characters), and integers (whole number values).

Output in Turing

Whenever we refer to a string in Turing (and most other languages), we need to put the characters in quotation marks:

```
put "First Program:"  
put "Hello world!"
```

Output in Turing Blank Lines

A blank line can be produced by printing the empty string, which is double-quotes with nothing in between.

```
put "Double"  
put ""  
put "spaced."
```

Output in Turing

Joining Multiple Lines

It is possible to join the output from two different commands on a single line. Use the put command, but add .. to the end of the line.

Note: The last put command should not have the .. on the end.

```
put "To be or not to be, " ..  
put "that is the question."
```



Output in Turing

Basic Calculations

Whenever we refer to a string in Turing (and most other languages), we need to put the characters in quotation marks:

```
put "First Program:"  
put "Hello world!"
```

For numbers, no quotation marks are needed. Turing recognizes that they are numbers.

```
put 35  
put 3.14
```


Mathematical Operations in Turing

To actually make use of the computer's calculating ability, we need to use some mathematical operators.

Operator	Operation	Code
+	Add	$A + B$
-	Subtract	$A - B$
*	Multiply	$A * B$
/	Divide	A / B
**	Exponent	$A ** B$

Math using Turing

```
put 3 + 5          % output is 8
put 4 - 11         % output is -7
put 2 * 6          % output is 12
put 7 / 2          % output is 3.5
```

Remember that Order of Operations (BEDMAS) applies to what you are doing. You can use brackets to ensure calculations are done in the order you want.