



The Raspberry Pi Single Board Computer (SBC)

3.2.4 Blockly

■ Variables and Basic Statements

- Blockly allows the creation of a program without entering any lines of code; it uses colored blocks.
- Blocks can be connected together by dragging and attaching the appropriate blocks.
- Creating a new variable in Blockly is a simple matter of dragging the variable block and filling in the value slot.



■ IF-THEN

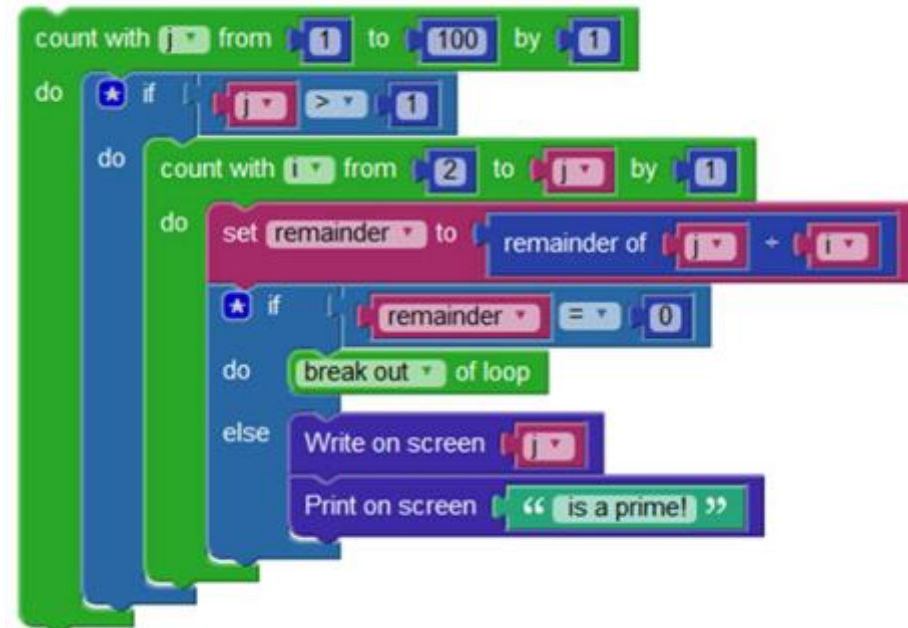
- Used to allow the code to make decisions.

■ FOR Loops

- Used to repeat the execution of a block of code for a specific number of times.

■ WHILE Loops

- Used to execute a block of code while a condition is true.





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3.2.5 Python on the Raspberry Pi

■ Using Blockly to Learn Python

- Blockly can be used to enhance Python understanding.
- Beginners can create Blockly programs, convert them to Python and study the result.

■ The Python Interpreter

- The Python interpreter understands and executes Python code.
- Python code can be created in any text editor and Python interpreters are available for many operating systems.
- Python developers can create and deploy Python programs in practically any operating system.
- When called with no arguments, the Python interpreter displays the ">>>" prompt and waits for commands; this is called interactive mode.

```
Python 3.4.2 (default, Oct 19 2014, 13:31:11)
Type "help", "copyright", "credits" or "license" for more information.
>>>
```



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Python on the Raspberry Pi (cont'd)

■ Variables and Basic Statements in Python

- Variables are labeled memory areas used to store runtime program data.
- To assign values to variables in Python, use the = (equal to) sign.
- Python's interactive mode implements the special variable “_”.

```
>>>
>>> tax = 12.5 / 100
>>> price = 100.50
>>> price * tax
12.5625
>>> price + _
113.0625
>>> round(_, 2)
113.06
```

• Useful Functions and Data Types in Python

- Python supports many useful functions and data types such as range(), tuples, lists, sets, and dictionary

```
list1 = ['car', 'train', 47, 2016];
list2 = [1, 2, 3, 4, 5, 6, 7 ];
print ('list1[0]: ', list1[0])
print ('list2[1:5]: ', list2[1:5])
```

When the above code is executed, it produces the following result -

```
list1[0]: car
list2[1:5]: [2, 3, 4, 5]
```



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Python on the Raspberry Pi (cont'd)

- **Importing Modules** Into Your Code
 - Use the **import <module>** keyword to import pre-written code into your programs.
- **IF THEN** In Python
 - Allows the execution a block of code based on the result of an expression.
- **FOR Loops** in Python
 - Iterates through the items of any sequence
- **WHILE Loops** in Python
 - Executes a block of code while the expression is true
- **Indentation is important in Python!**

```
>>>
>>> x = int(input("Please enter an integer: "))
Please enter an integer: 42
>>> if x < 0:
...     x = 0
...     print ('Negative changed to zero')
... elif x == 0:
...     print ('Zero')
... elif x == 1:
...     print ('Single')
... else:
...     print ('More')
...
More
```



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Python on the Raspberry Pi (cont'd)

- Cisco Support for Cybersecurity Professionals
 - DevNet
 - Cisco provides a beneficial community named DevNet.
 - DevNet is available to assist you in learning to code, use software and programs, and partner with others.
 - Webex Teams
 - Webex Teams is a cloud service that provides persistent chat, room-based collaboration, WebRTC video conferencing, and more.
 - Developers can create code that can be used to integrate specific solutions with Webex Teams via the Webex Teams REST API.
 - Webex Teams REST API can include automated Webex Teams messages based on real-world events that occur in a popular application/program



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3.2.6 Uses of the Raspberry Pi

■ Artificial Raspberry Pi Pancreas

- Dana Lewis and her husband used a Raspberry Pi to build an artificial pancreas.
- It was possible due to the Pi's small size and low power requirements.

■ 4Borg Pi Robot

- PiBorg is an affordable robot kit built around a Raspberry Pi.
- It is both fun and educational.

• Controlling the Arduino Through the Pi

- While the Pi is powerful, it may not be the best option for all projects.
- The Pi doesn't include analog GPIO pins.
- The Pi is **not** real-time.
- The Pi's power requirements and size may be too large, depending on the application.
- To adjust to these limitations, an Arduino may be used.

