Using Flowcharts for Algorithms

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Algorithms, Pseudocode & Code

- An Algorithm is your plan/idea (how to solve a problem)
  - May be expressed in many different ways
    - Mathematical Expression
    - Pseudo Code (written text)
- Pseudocode is the written expression of the Algorithm
  - It is simply a description on how your program should work in plain English or another language
- Code – this is what you program (Syntax) to enact your algorithms
- Other notes:
  - Some people are great at code
  - Some are great at developing algorithms
    - Innovation really comes great algorithms!
    - Optimization comes from great code!
Flowcharting

• Flowcharts allow one to see a pictorial representation of the process.
• They make it easier to understand the process at hand!
• MS Visio is a great tool for developing flowcharts as you can easily drag and drop the symbols.
Flowchart Symbols

**Terminator**
Indicates the beginning or end of a program flow in your diagram.

**Process**
Indicates any processing function.

**Decision**
Indicates a decision point between two or more paths in a flowchart.

**Delay**
Indicates a delay in the process.

**Data**
Can represent any type of data in a flowchart.

**Document**
Indicates data that can be read by people, such as printed output.

**Multiple documents**
Indicates multiple documents.

**Subroutine**
Indicates a predefined (named) process, such as a subroutine or a module.

**Preparation**
Indicates a modification to a process, such as setting a switch or initializing a routine.

**Display**
Indicates data that is displayed for people to read, such as data on a monitor or projector screen.

**Manual input**
Indicates any operation that is performed manually (by a person).

**Manual loop**
Indicates a sequence of commands that will continue to repeat until stopped manually.

**Loop limit**
Indicates the start of a loop. Flip the shape vertically to indicate the end of a loop.

**Stored data**
Indicates any type of stored data.

**Connector**
Indicates an inspection point.

**Off-page connector**
Use this shape to create a cross-reference and hyperlink from a process on one page to a process on another page.

**Collate**
Indicates a step that organizes data into a standard format.

**Sort**
Indicates a step that organizes items list sequentially.

**Merge**
Indicates a step that combines multiple sets into one.

**Database**
Indicates a list of information with a standard structure that allows for searching and sorting.

**Internal storage**
Indicates an internal storage device.

Visio Basic Flowchart Shapes

- Process
- Subprocess
- Document
- Database
- Custom 1
- Custom 3
- On-page reference
- Decision
- Start/End
- Data
- External Data
- Custom 2
- Custom 4
- Off-page reference
MS Visio Basic Flowchart Example

http://www.sawyoo.com/postpic/2015/03/visio-flowchart-shapes_206705.png
HR Hiring Process Flowchart

Microsoft Word Process Flowchart Template Example

Flowcharting Resources

- MS Visio 2016 Tutorial
  - [https://www.youtube.com/watch?v=b09dKHvu4-4](https://www.youtube.com/watch?v=b09dKHvu4-4)
Common Errors

- Arrows / Flow issues
  - Missing
  - Direction
  - Decision Symbols

- Incorrect Symbol usage
  - Documentation vs Process
    - Think of documentation as a special type of process that has a special symbol
  - Decision
    - Label them
    - Cleaner to use one line per joint

- Subprocess vs Process
  - Subprocess symbols will require another flowchart

- Continuation References
  - On or off page symbols