Logic, flow, and Programming

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The Programmer's job can be broken down into six programming steps:

1. Understand the problem
2. Plan the logic
3. Code the program
4. Translate the program into machine language
5. Test the Program
6. Use the program

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1. Understand the Problem

• To understand the problem, you much *analyze* it.

• Really understanding the problem can be one of the most **difficult** aspects of programming.

  • Description of what user needs may be vague.

  • User doesn't really know what they want.

  • User changes their mind after seeing sample output.

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2. Plan the Logic

• Programmer plans the steps to the program, deciding what steps to include and how to order them

• Two common tools:

  • **Flowchart:** Pictorial Representation

  • **Pseudocode:** English-like representation

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What do we mean by "Logic"

• Most programs conduct "tasks"

• Many of these involve evaluation
  • (requires basic logic or "conditions")

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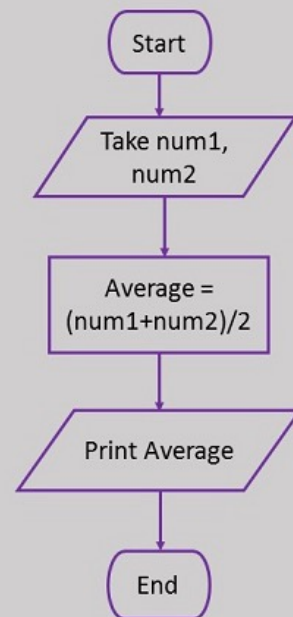# What do we mean by "Logic"

• Most programs conduct "tasks"

• Many of these involve evaluation
  • (requires basic logic or "conditions")

• If <condition> <do action/statement>
  • Else <do action/statement>

• Condition is 'Boolean' (Either True or False)

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Flowchart

• Pictorial Representation of logical steps to solve a problem

  • Uses Standard Symbols

  • Utilize Formula Notation

  • Typically read:

    • Top to bottom

    • Left to right

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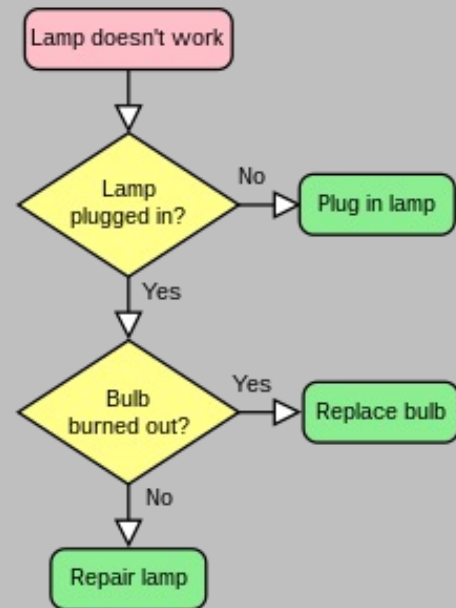# What doesn't the light turn on?

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What doesn't the light turn on?

1. Check if unplugged
   - Yes -> plug in
   - No -> next check

2. Check if bulb is burned out
   - Yes -> Replace bulb
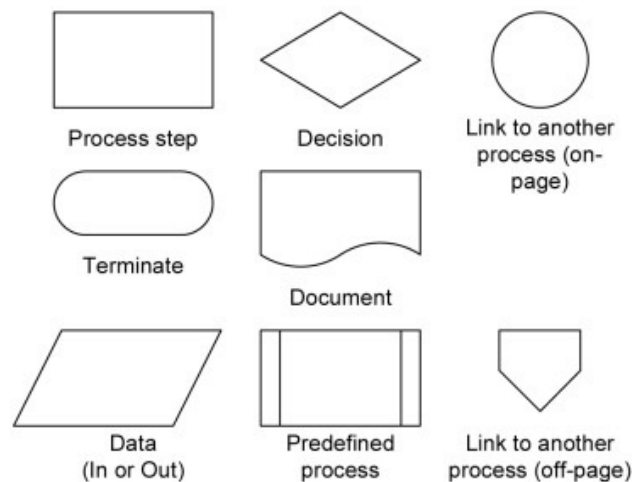   - No -> next check?/repair?/replace?

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1. Check if unplugged
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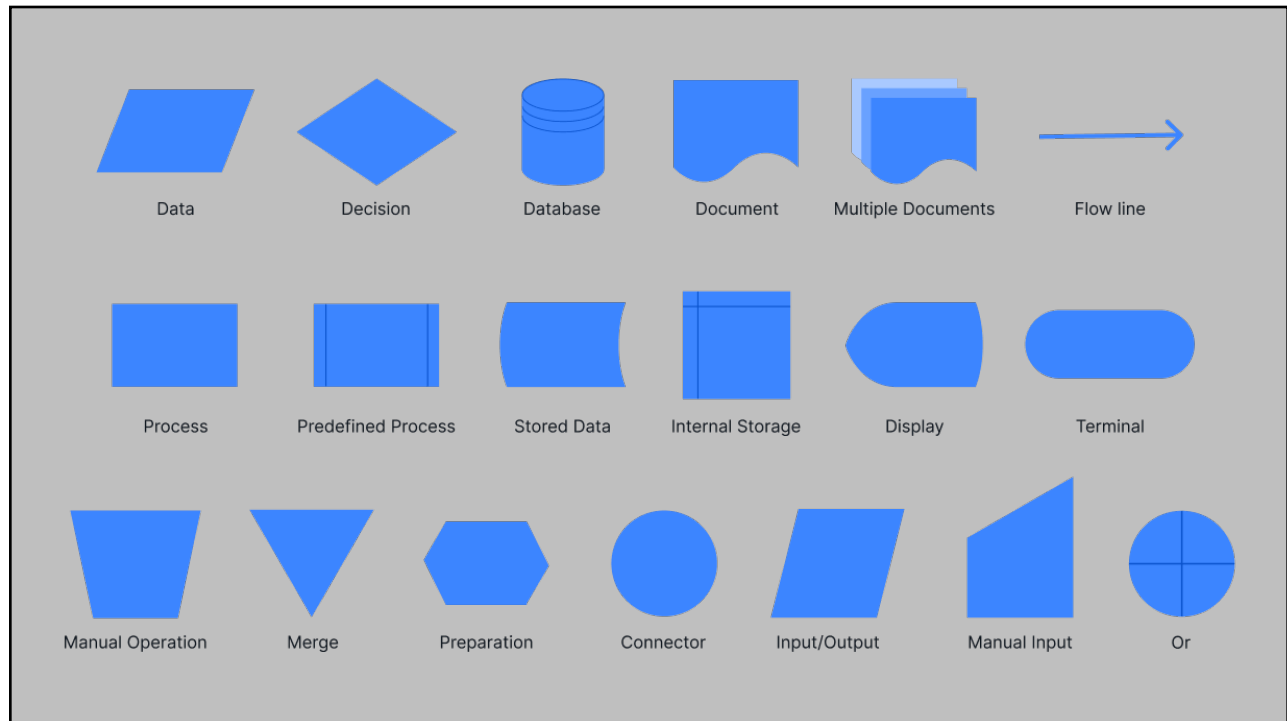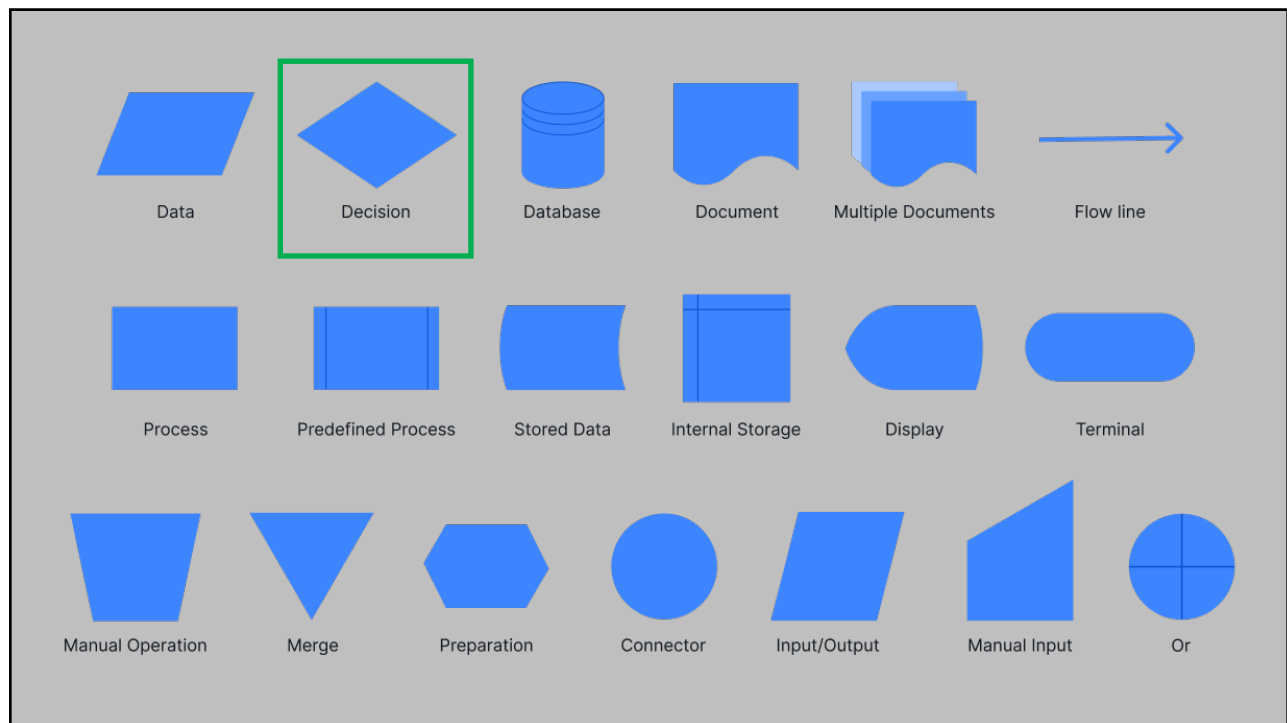   - No -> next check?/repair?/replace?

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The conventional flow chart shapes

These are the standard symbols to be used for flow charts. Get to know them and use them. The symbols will then allow all flow charts to be consistent and they also help to get extra information on to the chart.
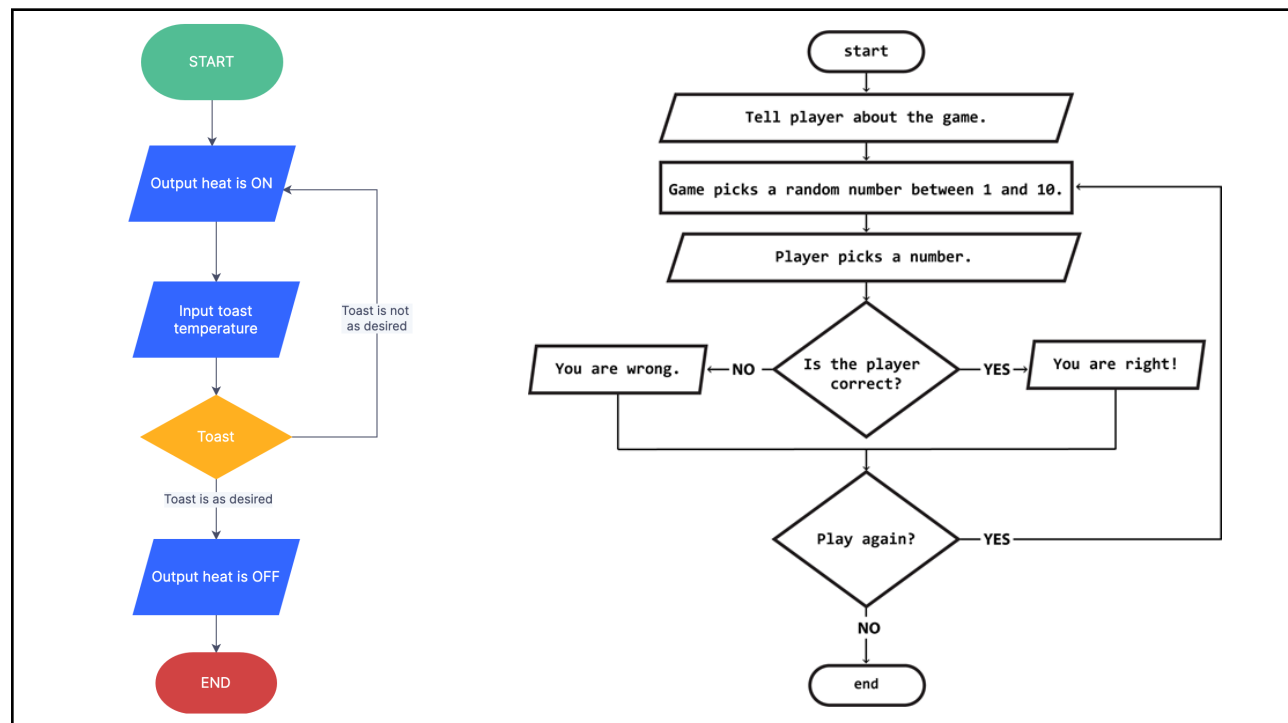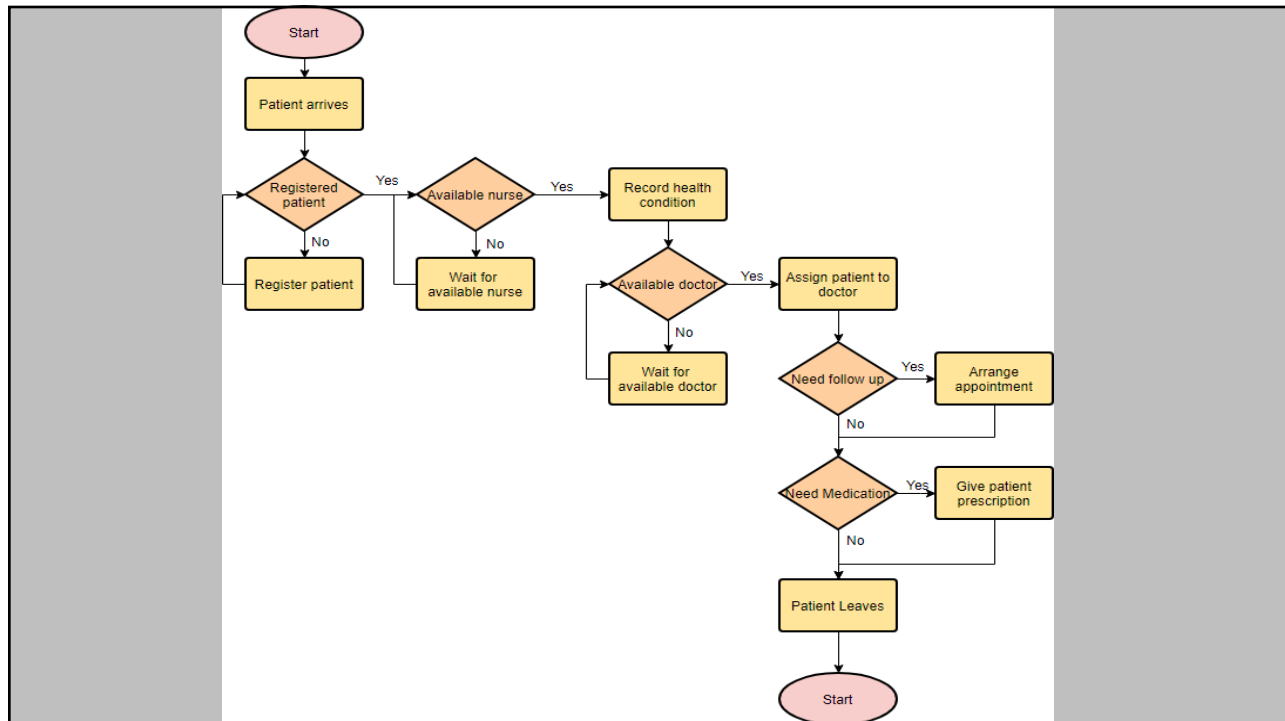
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Relational Expressions

Operator	Meaning	Example	Value
==	equals	`1 + 1 == 2`	`true`
!=	does not equal	`3.2 != 2.5`	`true`
<	less than	`10 < 5`	`false`
>	greater than	`10 > 5`	`true`
<=	less than or equal to	`126 <= 100`	`false`
>=	greater than or equal to	`5.0 >= 5.0`	`true`

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Logic/Flowchart Practice #1

Vending Machine
- Coin(s) inserted determine if/which item to vend.
  - Nickel, Dime, Quarter (if Penny reject)

  - Undergraduate
    - (assume only water for $1.25)

  - Graduate Student multi-item machine
    - (Coke, Diet , Sprint , Root beer: all are $2.25)

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Logic/Flowchart Practice #2

- Take an input date and determine/print the next date.

  - Input is Day, Month, Year

  - For Example: 31 August 2023 -> 1 September 2023

  - Make sure your logic works for any day and any year.

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