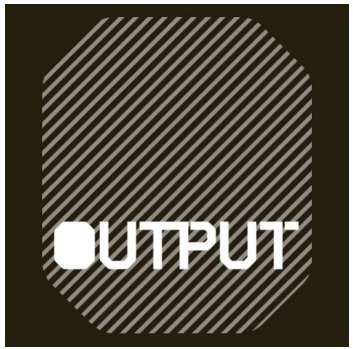
Pseudocode

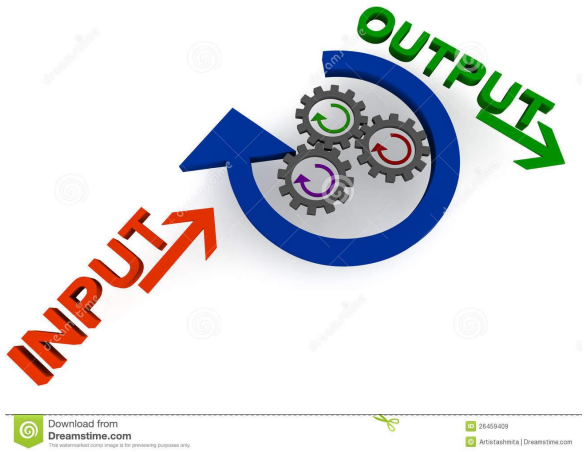
Pseudocode

- Describes algorithms in a more robust, mathematical sense then writing them step-by-step

Pseudocode

- Needs defined: Inputs, Outputs, and Assumptions
  - Help clarify what is needed and what the goal is





Decimal to Hex: Pseudocode

- Converting base 10 to hex- **Divide by 16 Algorithm**

1) Assume the number is > 0
2) Divide the number by 16, write the remainder in a stack (bottom up)- convert to hex notation if necessary
3) When the number is reduced to zero, flip the stack. This is your hex number.

Decimal to Hex: Pseudocode

- Assumptions: Number is > 0
- Input: A base 10 number
- Output: A hexadecimal number

- *These three parts MUST be included in any pseudocode you write*

Pseudocode Details

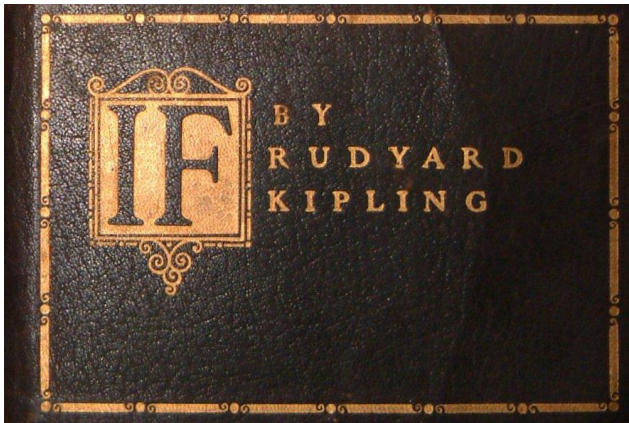
- Prompts must appear as they would appear to a user
- State destination of output (ex: Display, File)
- Each number should be a **variable**
  - Should represent a **GENERAL number**, not a specific value

Pseudocode Details

- Surround variable names with ‘<’ and ‘>’
- Make up instructions as necessary
  - “Turn on the computer”, “Vibrate phone for 1 second”

Repetitions and Conditionals

- Conditionals provide the foundation for pseudocode
  - **If** something is true...complete a task
  - **Else** complete another task



Repetitions and Conditionals

- Repetitions can be added at any point in pseudocode
  - Can happen **while** a condition is waiting to become true
  - Can happen **for** a specific number of times

Decimal to Hex Pseudocode

<dec> = input

<stack> = <empty>

Initialize variables - set <dec> (decimal) to the input, and set the <stack> to empty (interpreted as all 0s)

Decimal to Hex Pseudocode

```
<dec> = input

<stack> = <empty>

While <dec> does not = 0:

    <dec> = <dec> / 16

    Push remainder to top of stack
```

The “While” section repeats until the condition (<dec> does not = 0) is reached

Decimal to Hex Pseudocode

```
---

<dec> = input

<stack> = <empty>

While <dec> does not = 0:

    <dec> = <dec> / 16

    Push remainder to top of stack

Reverse <stack>

Print <stack> to Display
```

Display the final answer on the screen by “printing” it

More pseudocode

Write an algorithm for your commute to school

More pseudocode

Write an algorithm for your commute to school

Assumptions: You have a means of transportation, you don’t live at school, there is a valid set of directions that lead to school, etc...

More pseudocode

Write an algorithm for your commute to school

Input: Starting Address

Output: Message stating “You have arrived”

More pseudocode

Write an algorithm for your commute to school

Distance = <d>

Turns = <right, left, straight>

More pseudocode

Assume you are starting at Catholic High

Turn <right> out of main gate
Travel <d> = 0.25 mile on Edison Highway
Turn <left> on Sinclair Rd
Travel <d = 0.50 mile on Sinclair
Turn <left> into main gate of Curley
Message >> “You have arrived”

Pseudocode Practice

- Walk across Sinclair Lane

- Assumptions: You can follow directions and see oncoming cars.
- Input: Cross the street
- Output: Crossed the street

Pseudocode challenge

- You have to program a robot to walk from Room 205 to an unspecified room on the second floor of Curley.
- Assumptions: The robot is placed directly in the middle of Room 205 and knows directions (left, right, etc…). It can read classroom number signs. The user will input an existing room.
- Input: The room the robot will go to.
- Output: The robot will beep when it reaches its destination