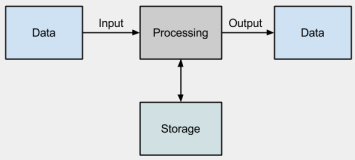
Computer Components and Calculations

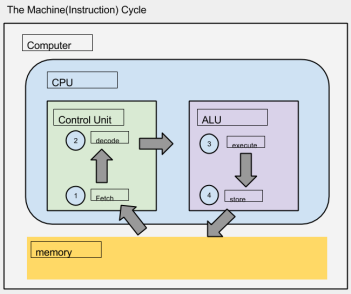


General process for all languages.
Appearances may vary

Computer Components in Excution

CPU + RAM = **Program.** CPU = 1 billion executions/sec. Steps called Machine Cycle.
CPU = Ctrl unit^{instructions} + Logic(ALU) ^{math}
Calculating a single instruction:
1. **Fetch** 2. **Decode** 3. **Execute** 4. **Store**
internal clock: sync computer operations

Machine Cycle



Programming Languages & Developing Process

C.S: Math + Engineering + Science
Skill 1: Problem Solving
C.S: what can be computed? Solution -> Algorithm
High level Language User intrepretable (s.c)
Low level Language Machine interpretative
Processing High Level Languages:
1. Interpreting: (read and execute)
2. Compiling (translate completely)

Programming Languages & Developing Process (cont)

Compiling VS Interpreting:
Once compiled, execute over and over
Interpreted program lets the user know bugs
Outcome Applications Software & OS

Information processing cycle

1: **input** 2: **processing** 3:**output** 4.**storage**

Error Types

Run-Time Errors:
occurs when the program is running (e.g division by 0)
or using a undefined variable
Exception Handling:
detect cases where r.t errors would occur
Specific Exception Handling:
specifying the error type
argument of an exception:
you can capture an exception's argument by supplying a variable in the except clause
e.g

```
answer = raw_input("choose a, b, or c:")
if answer != "a" and answer !="b" and answer !="c":
raise ValueError("Question 1: Invalid Input: please enter a, b, or c")
else:
print "thank you"
except ValueError, errorvar:
print errorvar
```

Varibles

anything in quotes are assigned as a string
pure numbers are assigned as integers
decimal is assigned as float
Rules
Case sensitive
_use_underscore_for_spaces
must begin wiht letter
Using input input("text") lets user input what they want for the variable

Data Types

int = integer
float = decimal
str = strings (words, letters, symbols)
Python Math
/ is for divide
** exponent
* multiply
+ add
- subtract
Use \" for double quotes in print statement
\t for tab
\n for line feed
\\ for backslash
for comment

IPO CHARTS

Gather input data
Process data
Output data

T and F

x = 4
y = 5
z = x > y
print "The result of",x,">",y,"is",z
result : False

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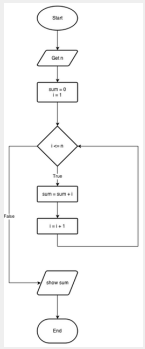
Calculating Totals



Functions and Libraries

int(<expr) convert to integer
float(<expr> convert an expression to float
abs(<expr>) return absolute value
round(<expr>) round off expression
pow(x,y) same as x**y
math.sqrt(c_sqrd)

Rounding off

round(pi,2) = 3.14