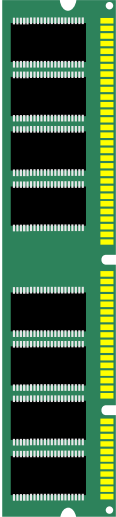
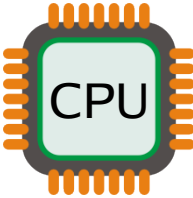
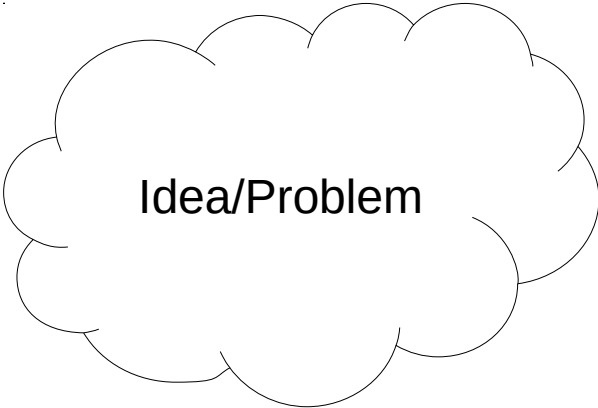
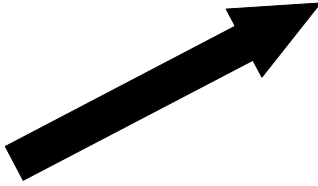


Partial Review
CGS3406

Computer



Idea/Problem



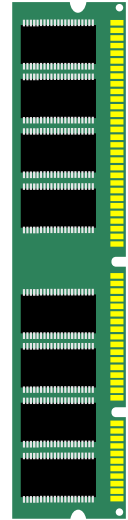
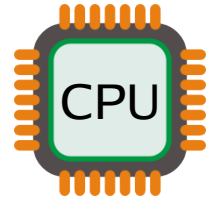
MOV
ADD
MULT
...



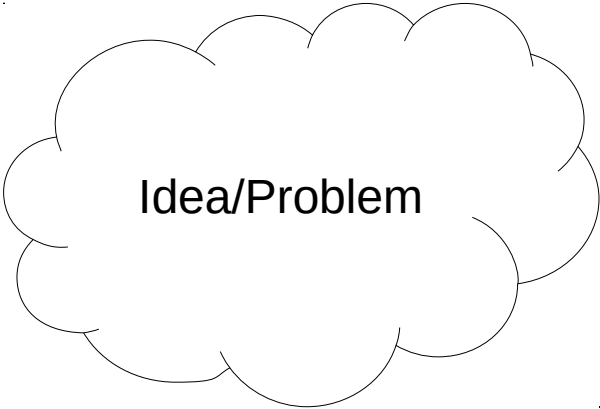
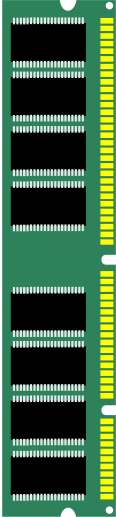
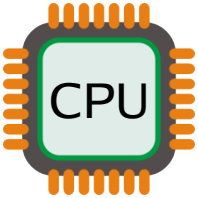
101100
100100
000000
110110
...



Computer



Computer



Algorithms

C++

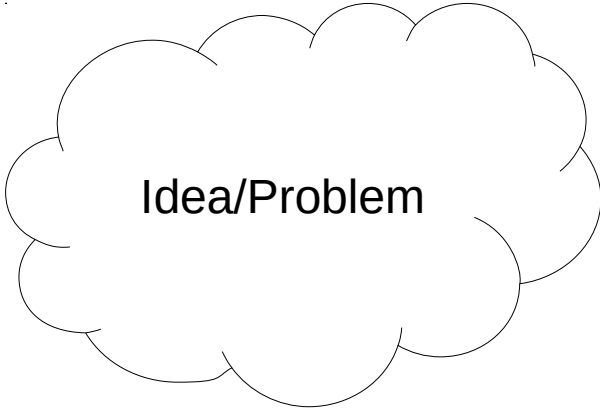
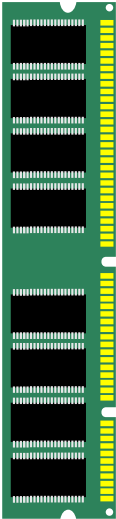
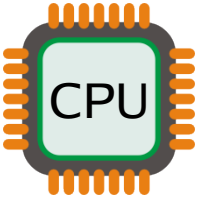
Step 1
Step 2
Repeat 1 and 2 until
If user inputs a neg. integer
...

```
do {  
    foo()  
    n()  
} while (...);  
if x < 0  
...
```

pseudo code
descriptions
...

syntax
libraries
...

Computer



Algorithms

C++

Step 1
Step 2
Repeat 1 and 2 until
If user inputs a neg. integer
...

```
do {  
    foo()  
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} while (...);  
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Algorithms and Code

- Abstraction
 - Hide complexity
- Decomposition
 - Break problem down in smaller more manageable pieces

Code

- Create sequence of instructions executed by processor to accomplish some task
- Programming language
 - C++
- Techniques/skills
 - Debugging
 - Refining algorithm/problem
 - Decomposition/abstraction
 - ...



instr₁
instr₂
instr₃
instr₄
instr₅
instr₆
...
instr_n

C++ Types

- Values and operations
- Types express valid and results of operations
 - $2+2$, $2/4$, $2.0/4$
- C++ types
 - Built-in (primitive) types
 - built into the language
 - int, float, char, ...
 - User-defined types
 - Classes
 - Enumerations
 - typedef definitions
 - Structures

C++ Statements

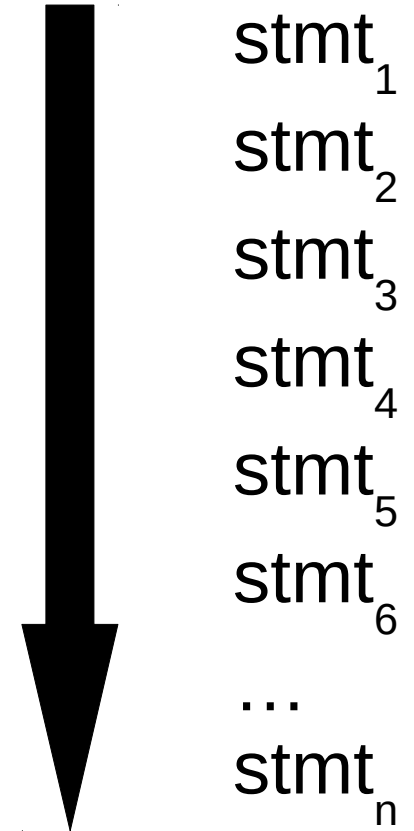
- Statements;
 - Simple;
 - Null
 - Expressions
 - Evaluations
 - E.g., function calls
 - Compound { }
 - Selection (conditional)
 - Repetition
 - Jump
 - Declaration



stmt₁
stmt₂
stmt₃
stmt₄
stmt₅
stmt₆
...
stmt_n

C++ Execution Flow

- Sequential
 - Default
- Conditionals
- Repetition
- Jump



Conditionals

```
if (expression)
    statement
else
    statement
```

```
if (expression)
    statement
```

```
if (expression)
    statement
else if
    statement
else
    statement
```

Conditionals

```
switch (expression)
{
    case constant:
        statements
    case constant:
        statements

    ... (as many case labels as desired)

    default: // optional label
        statements
}
```

Conditionals

```
condition-expr ? true-expr : false-expr
```

Repetition

```
while (expr)  
    statement
```

```
do  
    statement  
while (expr);
```

```
for (initializer-expr; condition-expr; loop-expr)  
    statement
```

```
for (type : expr)  
    statement
```

Jump

- immediate (non-conditional) transfer of control
- **break**
 - switch, loops
- **continue**
 - loops
- **return**

C++ Operations

- Arithmetic

`+, -, *, /`

- Logical

- Comparisons

- Boolean operators

`&&`

`||`

`!`

- Short circuiting

Type Modifiers

- `const`
- References
- Pointers
- Arrays

Functions

Declaration

```
return-type function-name( parameter-list );
```

Definition (and declaration):

```
return-type function-name( parameter-list )  
{  
    function-body (declarations and statements)  
}
```

Call

```
function-name(arguments)
```

Scope

- In-class discussion