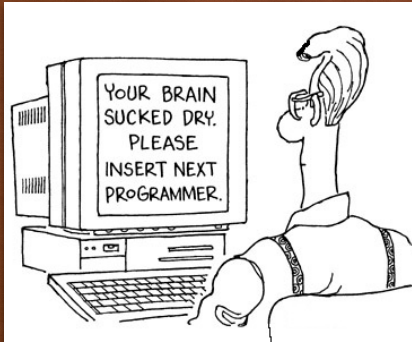




Why is Programming Hard?

Computers are incredibly, incredibly DUMB.

Computers do **exactly** what they are instructed to do.

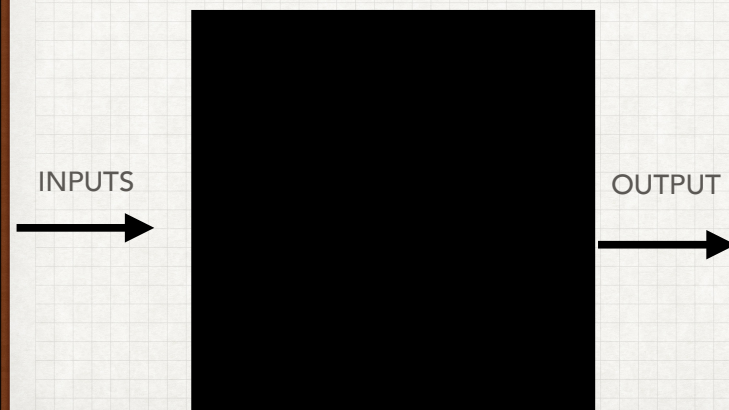
- Computers do **not** do what you **want** them to do.
- Computers do **not** do what you **thought** you told them to do.
- Computers do **exactly** what they've been **instructed** to do.

Because computers are so DUMB, we have to

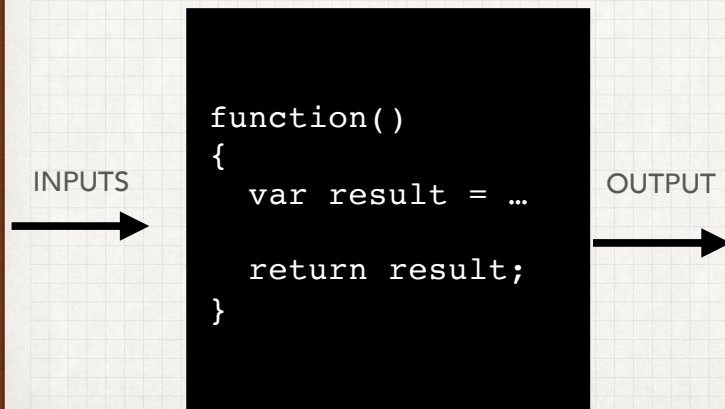
- think of and write instructions for all possible contingencies,
- be incredibly precise when expressing those instructions.

BROAD CATEGORY	2016 AVERAGE
Engineering	\$64,891
Computer Science	\$61,321
Math & Sciences	\$55,087
Business	\$52,236
Agriculture & Natural Resources	\$48,729
Healthcare	\$48,712
Communications	\$47,047
Social Sciences	\$46,585
Humanities	\$46,065
Education	\$34,891

PROGRAMMING: making the black box work



PROGRAMMING: making the black box work



PROGRAMMING

3 STEPS

1. Understand the problem, constraints, goals
2. Create the logic to solve it
 - tools: pictures, research, pseudo code, algorithms
 - modeling the data (data structures)
3. Write: translate into computer language (e.g. javascript)
 - tools: research, reading, learning apis
 - document logic

WHAT AM I?

Value	y	typeof y
<code>var x = "Hello"</code> <code>var y = x</code>		
<code>var y = x[1]</code>		
<code>var x = 3</code> <code>var y = x</code>		
<code>var x = [3,4,5]</code> <code>var y = x;</code>		
<code>var y = x[1]</code>		
<code>var x = true</code> <code>var y = x;</code>		

WHAT AM I?

Value	y	typeof y
<code>function foo(){return 1;}</code> <code>var y = foo;</code>		
<code>var y = foo();</code>		
<code>var y = greeting</code>		
<code>var greeting;</code> <code>var y = greeting</code>		

```
line 1: function foo(){  
line 2:   var i = 0;  
line 3:   while (i < 3) {  
line 4:     i = i + 1;  
line 5:   }  
line 6:   return i;  
line 7: }
```

```
1: function foo(){  
2:   var i = 0;  
3:   while (i < 3) {  
4:     i = i + 1;  
      // code  
5:   }  
6:   return i;  
7: }
```

```
// pseudo code  
1: function foo(){  
2:   var i = 0;  
3:   if (i < 3) {  
4:     i = i + 1;  
      // code  
5:     Go To line 3:  
5:   }  
6:   return i;  
7: }
```

```
function foo(){  
  var i = 0;  
  while (i < 3) {  
    // do something  
    i = i + 1;  
  }  
  return i;  
}
```

```
function foo(){  
  for (var i = 0; i < 3; i++){  
    // do something  
  }  
  return i;  
}
```

JAVASCRIPT CHEATSHEET

MEMORY MEMOS

OPERATION CODE CLEANUP

```
function crazy(data){  
  var count=0;  
  while(count<10){  
    count++;  
    if(count==5){  
      var hit5=1;  
      for(var i=0;i<data.length;i++){  
        if (i=data.length-1){  
          console.log("last");  
          count==count+2;  
        }  
        else {  
          count=count+3;  
        }  
      }  
      return count;  
    }  
  }  
}
```

```
function crazy(data){
  var count=0;
  while(count<10){
    count++;
    if(count==5){
      var hit5=1;
      for(var i=0;i<data.length;i++){
        if (i=data.length-1){
          console.log("last");
          count==count+2;
        }
        else {
          count=count+3;
        }
      }
    }
  }
  return count;
}
```

INDENT

```
function crazy(data){
  var count=0;
  while(count<10){
    count++;
    if(count==5){
      var hit5=1;
      for(var i=0;i<data.length;i++){
        if (i=data.length-1){
          console.log("last");
          count==count+2;
        }
        else {
          count=count+3;
        }
      }
    }
  }
  return count;
}
```

INDENT

```
function crazy(data){
  var count = 0;
  while(count < 10){
    count++;
    if(count == 5){
      var hit5 = 1;
      for(var i = 0; i < data.length; i++){
        if (i = data.length - 1){
          console.log("last");
          count == count + 2;
        }
        else {
          count = count + 3;
        }
      }
    }
  }
  return count;
}
```

SPACES

```
function crazy(data){
  var count = 0;
  while(count < 10){
    count++;
    if(count == 5){
      var hit5 = 1;
      for(var i = 0; i < data.length; i++){
        if (i = data.length - 1){
          console.log("last");
          count == count + 2;
        }
        else {
          count = count + 3;
        }
      }
    }
  }
  return count;
}
```