Programming Languages as cars

C
A racing car that goes incredibly fast but breaks down every fifty miles.

C++
A souped-up version of the C racing car with dozens of extra features that only breaks down every 250 miles, but when it does, nobody can figure out what went wrong.

Assembly
You are the car.
EECS 370 Discussion

Undergrad at Michigan Tech
Houghton, MI
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Excited By:

Embedded Systems
Space Stuff
Mandolin
Sci-Fi / Fantasy

Come say hello during Office Hours
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Two’s Complement Numbers
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Two’s Complement Numbers

Example:

-37 in 8-bit two’s complement binary
Example:
-37 in 8-bit two’s complement binary
Answer: 11011011₂
Two’s Complement Numbers

Example:
-37 in 8-bit two’s complement binary
Answer: $11011011_2$

Question:
-37 => $11011011_2$
219=> $11011011_2$

How do you know the difference?
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C vs C++

Not in C:
- Classes & Objects
- Namespaces
- New & Delete
- Cout & Cin
- Data Structures
- String datatype
printf() Examples

```c
#include <stdio.h>
int main( ) {
    printf("Hello World");
}
```

```c
#include <stdio.h>
int i;
for (i = 0; i < 10; i++) {
    printf("i= %d\n", i);
}
```
char* text = "Hello";

Equivalent to

char text[] = {'H', 'e', 'l', 'l', 'o', '\0'};
char* text = "Hello";
char* copy;
copy = text;

Why is this wrong?
String Examples

char* text = “Hello”;
if (text == “Hello”) {
    ...
}

Why is this wrong?
malloc() Examples

```c
int *foo;
foo = (int *) malloc(sizeof(int));
*foo = 5;
...
free(foo);
```
Bit Twiddling Examples

char data = 87;

How would you set the 6\textsuperscript{th} bit of data?
Bit Twiddling Examples

char data = 87;

How would you set the 6th bit of data?
data |= (1<<6);

also acceptable:
data |= (0x40);
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Project 1 Overview
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Project 1 Overview

Translate to binary:
ADD 0 0 5
Project 1 Overview

Translate to binary:

ADD 0 0 5

Equals: 0x00000005
Equals: 5_{10}
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Project 1 Overview

ADD 0 0 5 --> 5_{10}

.fill 5 -----> 5_{10}

What’s the difference?