COMP1511 19T1
Week 7, Tuesday: Structure and Composition

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references and indirection
structured data

Administrivia

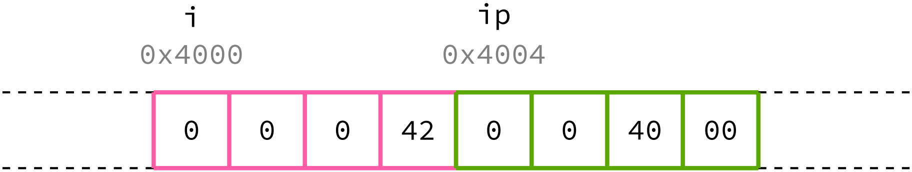
Don’t panic!

Assignment 1: Coco
out now … due 7 April 23:59:59

Weekly Test #4
due *tomorrow*, 3 April 23:59:59

No Marc!
on week06tue, week06thu, week07tue
lectures by Jashank, instead.

Memory is...



memory is a linear array of lots of boxes: bytes

variables are a group of bytes:

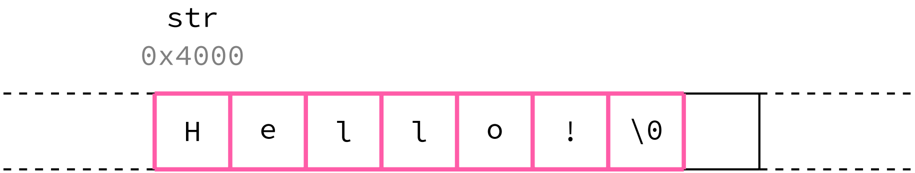
```
int i = 42;
```

variables have size, location

variables can store locations of other variables

```
int *ip = &i;
```

Memory is...



memory is a linear array of lots of boxes: bytes

arrays are contiguous sequences of variables:

```
char str[] = "Hello!";
```

pointers and arrays are mostly interchangeable;
'*' is mostly equivalent to '[]'
arithmetic on pointers is well-defined but horrific

New Operations

Reference and Dereference

&

reference, address-of;
‘where is this variable in memory?’

*

dereference, indirection
‘what’s at this location in memory?’

`sizeof`

‘how big is this variable or type?’

No Argument From Me

`main` is a rather peculiar function.

```
int main (void);
```

No Argument From Me

`main` is a rather peculiar function.

```
int main (void);
```

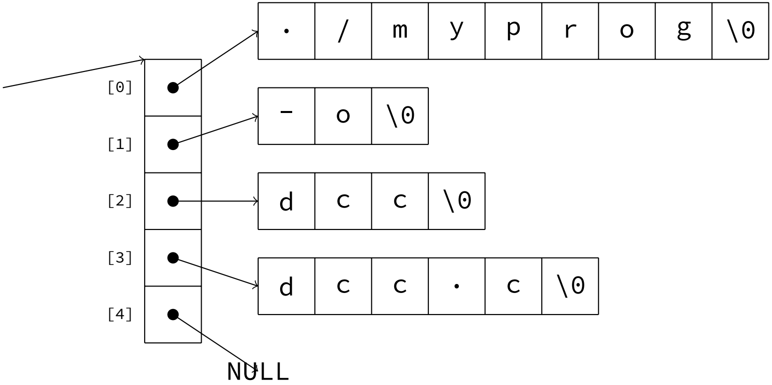
Except... that's not the only way to do it.

```
int main (int argc, char *argv[]);
```

argc: the argument count;
argv: the argument vector

No Argument From Me

What’s That ‘argv’ Thing?



struct

Record Types; Product Types; Tuple Types

Structured types let us compose
our own complex expressions.

```
struct tag {
    member-type member-name,
    …
};
```