CS 631 C and Scanning

C Programming
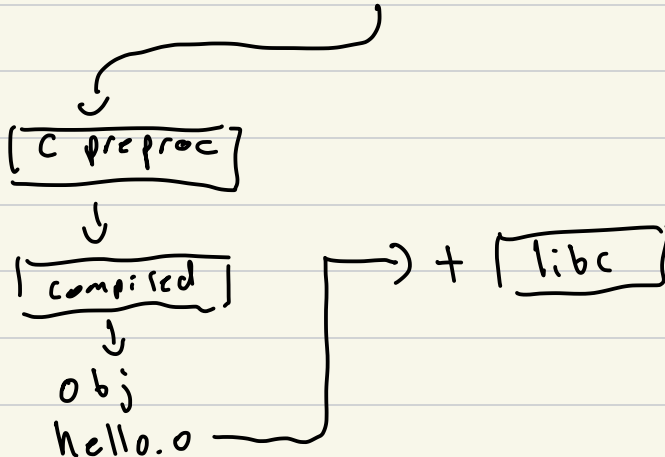
.c   .h   (C preprocessor)

Data

Functions

Statements / expressions
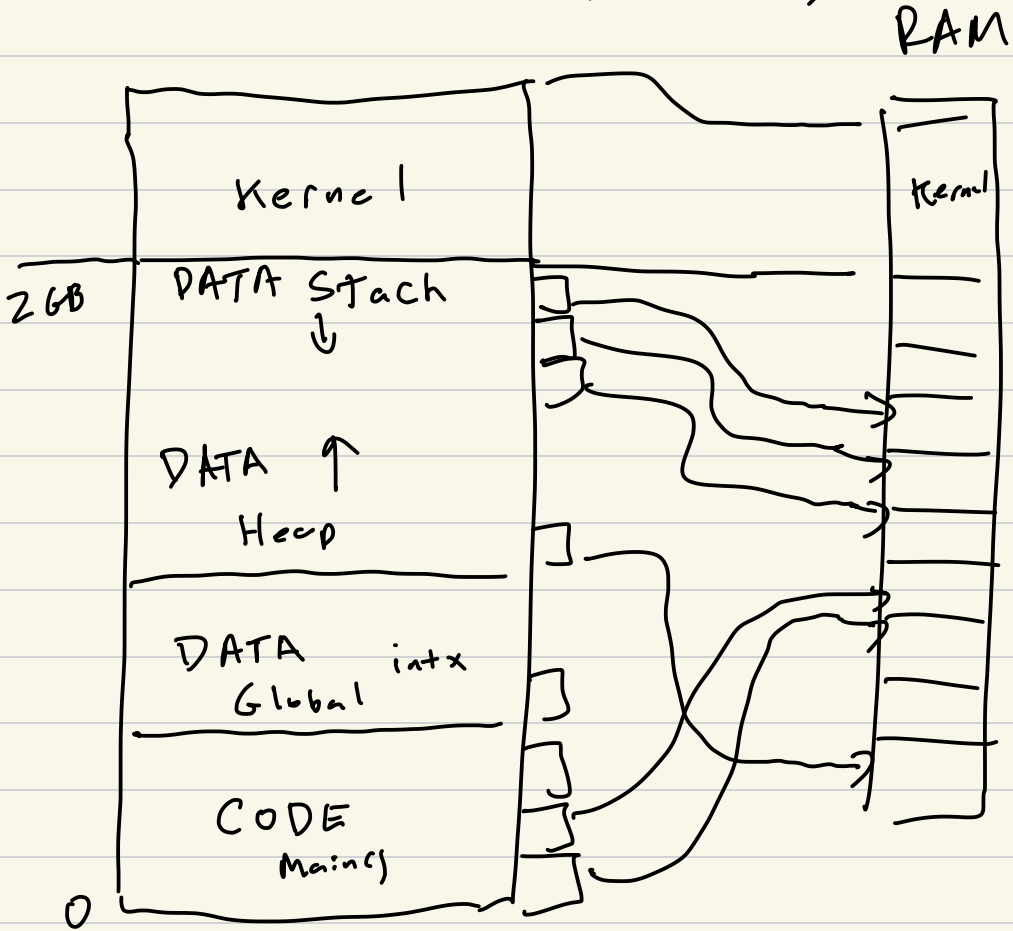
gcc -o hello hello.c

```
[ C preproc ]
      ↓
[ compiled ]
      ↓
   obj
   hello.o  ──────┐
                  │
                  └──> + [ libc ]
```

Data in C

Global
Stack (local vars)
Heap   (malloc() / free())

RAM

Kernel

2GB

DATA Stack
↓

DATA ↑
Heap

DATA   intx
Global

CODE
Main()

Kernel

0

C

Data

native types
int , char , float , double.
unsigned int

```
int *p;
uint32_t x;
uint64_t y;
```
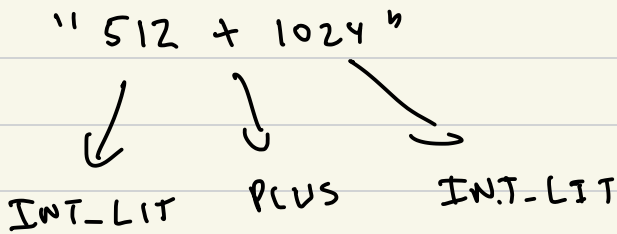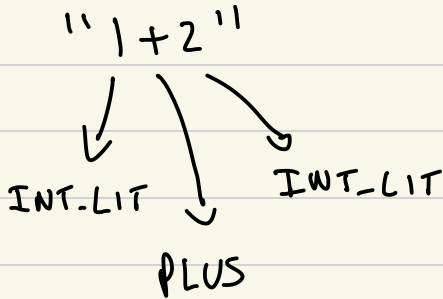
composite types

arrays   int arr [10];

struct

```
union {
    int x;
    float y;
} my union;
```

Scanning / Lexing / Lexical Analysis

ntlang

"1+2"

INT.LIT   INT_LIT

        PLUS

"512 + 1024"

INT_LIT   PLUS   INT.LIT

"=="

EBNF - Extended Backus Naur Form

tokens ::= (symbol)*
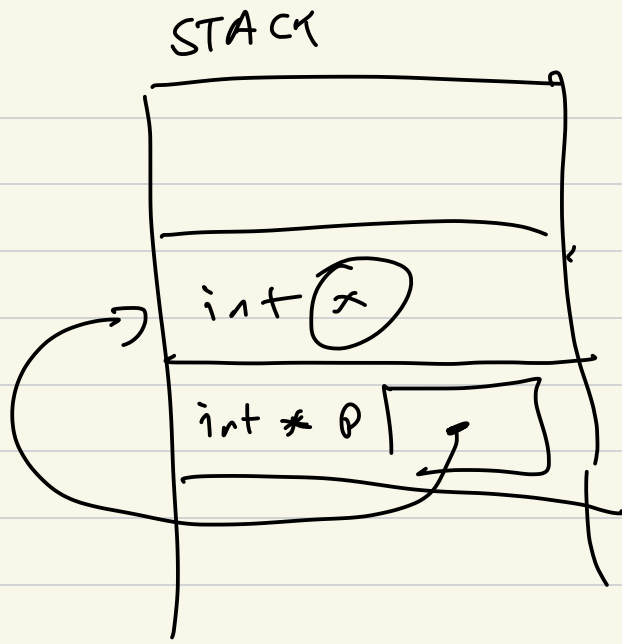symbol ::= '+' | '-' | '/' | '*'

"+-+"

STACK

```
Foo() {
    int x;
    (int *)p;
        p = &x;
            y = *p;
}

Main() {
    Foo()
}
```
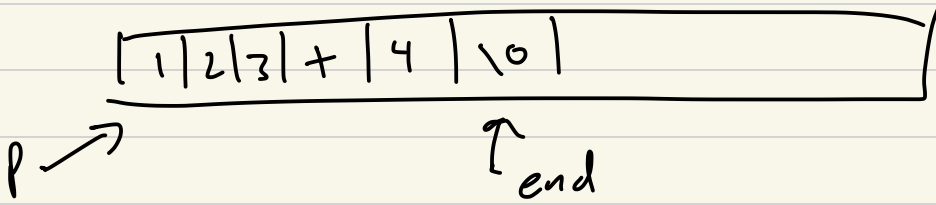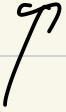
int (x)

int * p

token
        token_id   TK_PLUS
        token_value   " + "

[1 | 2 | 3 | + | 4 | \0]

p →

↑ end

Scan _table

t_0	t_1	t_2	

ptr