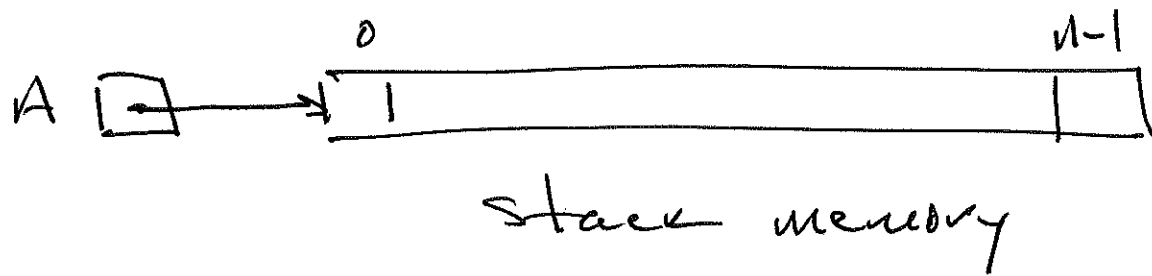


- Pal ext. to Thur. 10 PM
- Grading scripts posted for Pal

VLA's (variable length arrays)

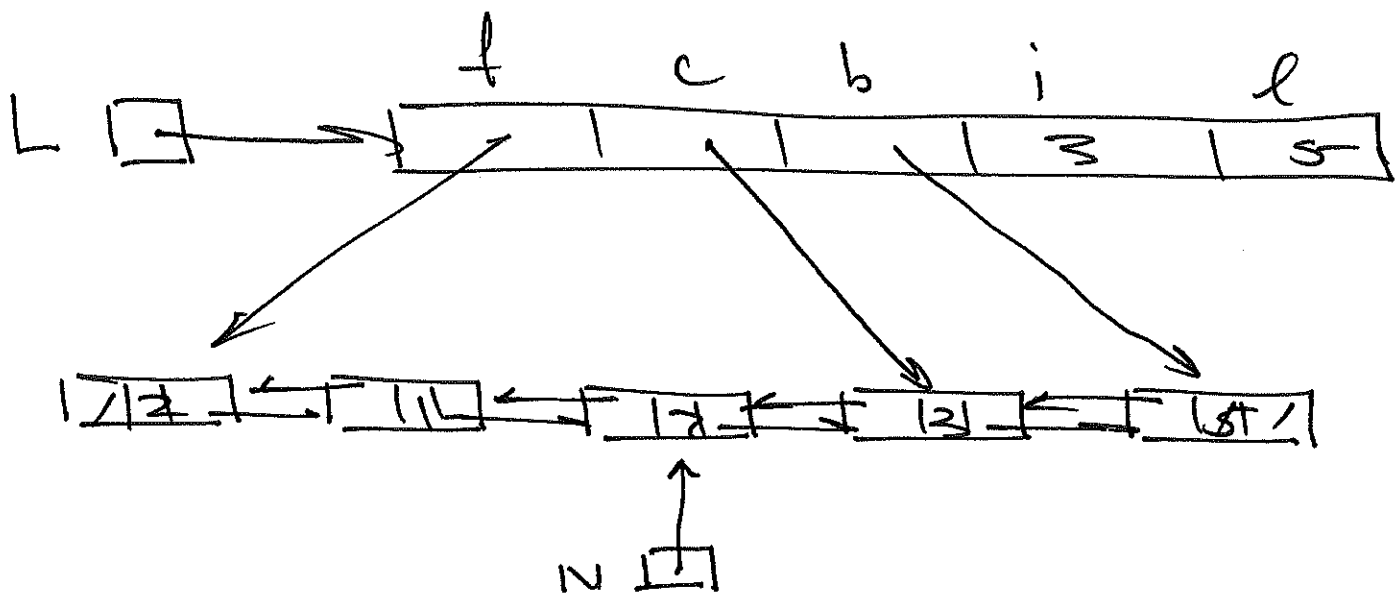
```
int A[n]; // n is a variable
// do something with A
```



Don't do this, instead do:

```
int* A = calloc(n, sizeof(int));
:
free(A)
```


inside:



Part example

0 ✓ 1 ✓ 2 ✓ 3 ✓
 $A = ["c" \quad "a" \quad "b" \quad "d"]$

Want: $L = (1 \ 2 \ 0 \ 3)$

sub-
array

start: $L = ()$

[]

insert 0: $L = (0)$

[c]

insert 1: $L = (0)$

$L = (1 \ 0)$

[ac]

insert 2: $L = (1 \ 0)$

$L = (1 \ 0)$

$L = (1 \ 2 \ 0)$

[abc]

insert 3: $L = (\underline{1} \ 2 \ 0)$

$L = (1 \ \underline{2} \ 0)$

$L = (1 \ 2 \ \underline{0})$

$L = (1 \ 2 \ 0)$

$L = (1 \ 2 \ 0 \ 3) \ [abcd]$

Handout:

ADT vs. Data Structures

Handout: Graph Theory , Graph Algorithms

Defn

A Graph G is a pair of sets

$$G = (V, E)$$

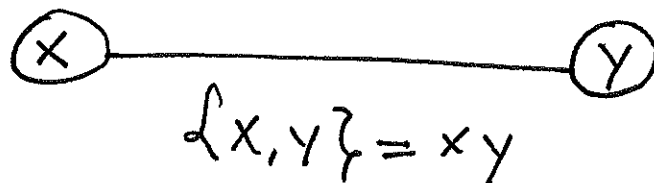
$\uparrow$
 vertices

$\uparrow$
 edges

where

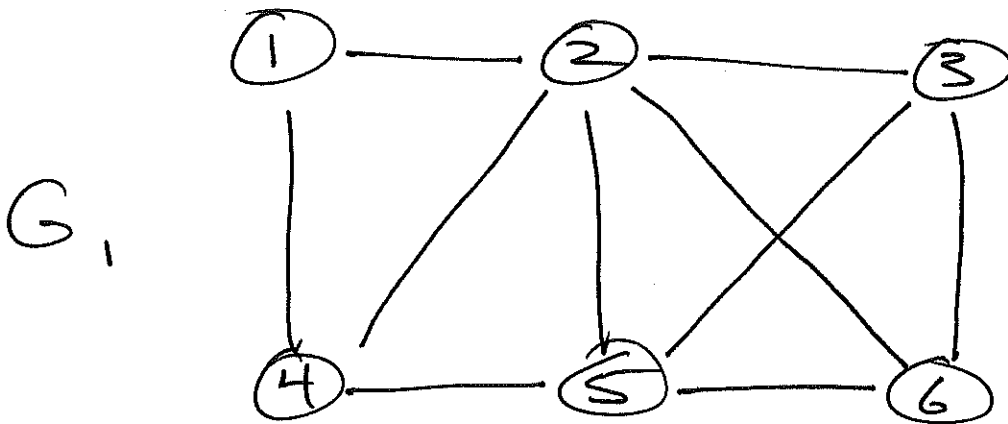
$$V \neq \emptyset$$

$$E \subseteq V^{(2)} = \{2\text{-subsets of } V\}$$



Ex. $V_1 = \{1, 2, 3, 4, 5, 6\}$

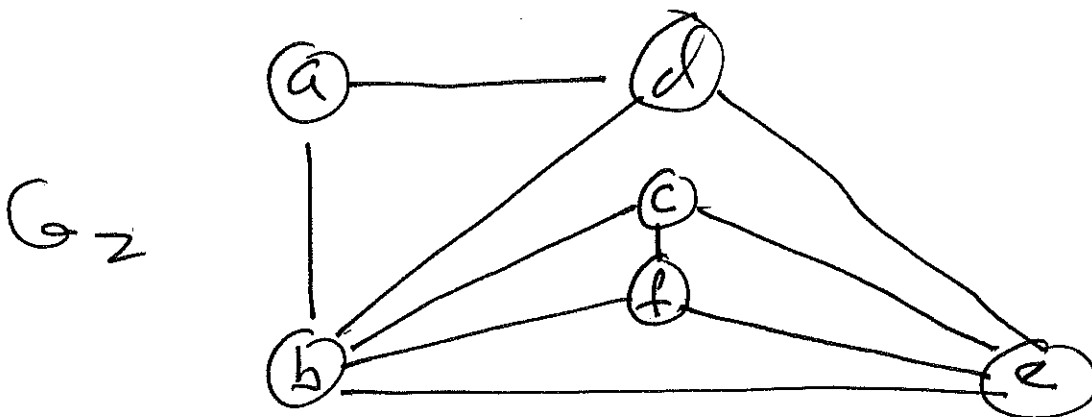
$E_1 = \{\bar{1}2, \bar{1}4, \bar{2}3, \bar{2}4, \bar{2}5, \bar{2}6, \bar{3}5, \bar{3}6, \bar{4}5, \bar{5}6\}$



x	$\deg(x)$
1	2
2	5
3	3
4	3
5	4
6	3

Ex. $V_2 = \{a, b, c, d, e, f\}$

$E_2 = \{a\bar{b}, a\bar{d}, b\bar{c}, b\bar{d}, b\bar{e}, b\bar{f}, c\bar{e}, c\bar{f}, d\bar{e}, d\bar{f}\}$



Defn

We say G_1, G_2 are

isomorphic iff there

exists a bijection $\phi: V(G_1) \rightarrow V(G_2)$

such that

$$\{x, y\} \in E(G_1) \Leftrightarrow \{\phi(x), \phi(y)\} \in E(G_2)$$

Defn

A Directed Graph or Digraph is

a Pair

$$G = (V, E)$$

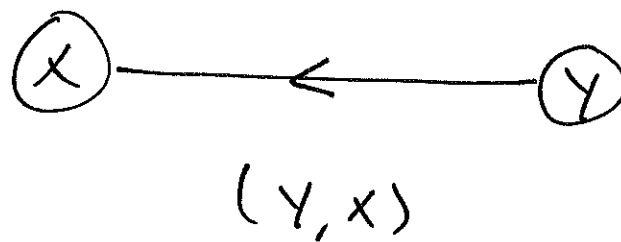
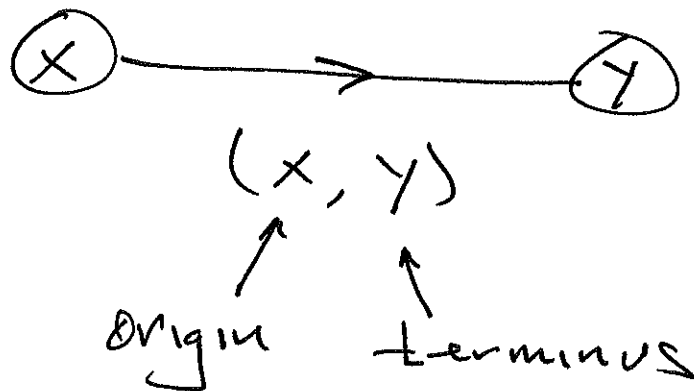
↑
vertices

↑
directed edges

where

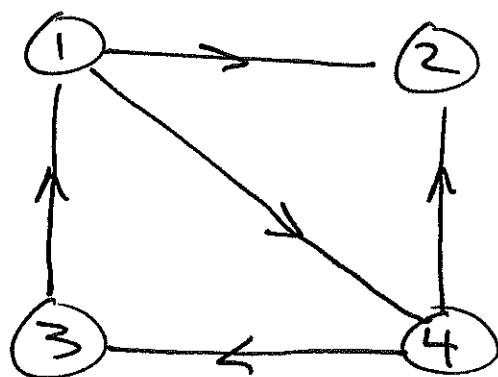
$$V \neq \phi$$

$$E \subseteq V \times V = V^2$$



Ex. $V = \{1, 2, 3, 4\}$

$E = \{(1, 2), (1, 4), (3, 1), (4, 2), (4, 3)\}$



x	$id(x)$	$od(x)$
1	1	2
2	2	0
3	1	1
4	1	2