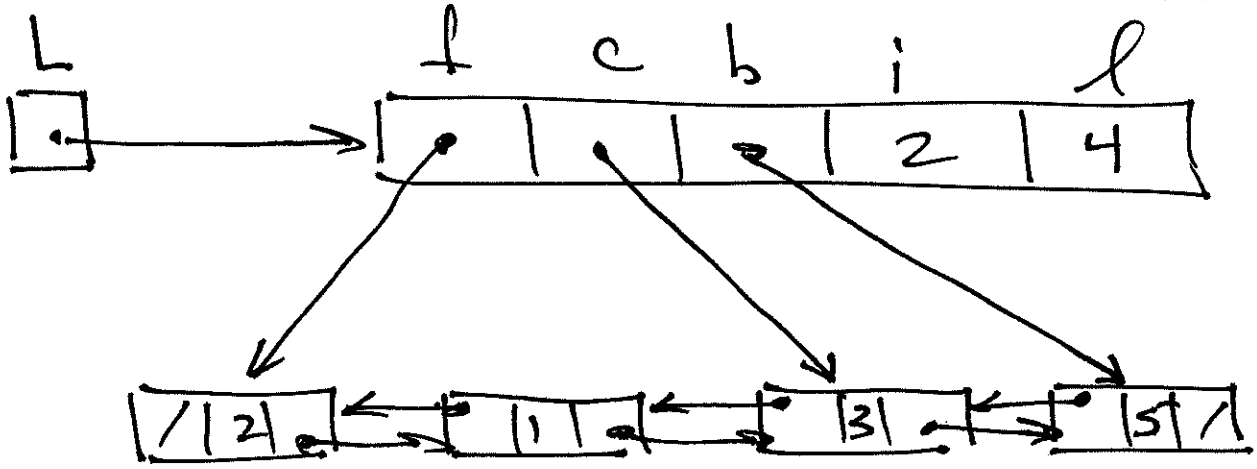
CSE 101 - 02 4-11-23

Pa1: ext 1 last day.

List ADT:

client view: (2 1 3 5)
0 1 2 3

inside view:

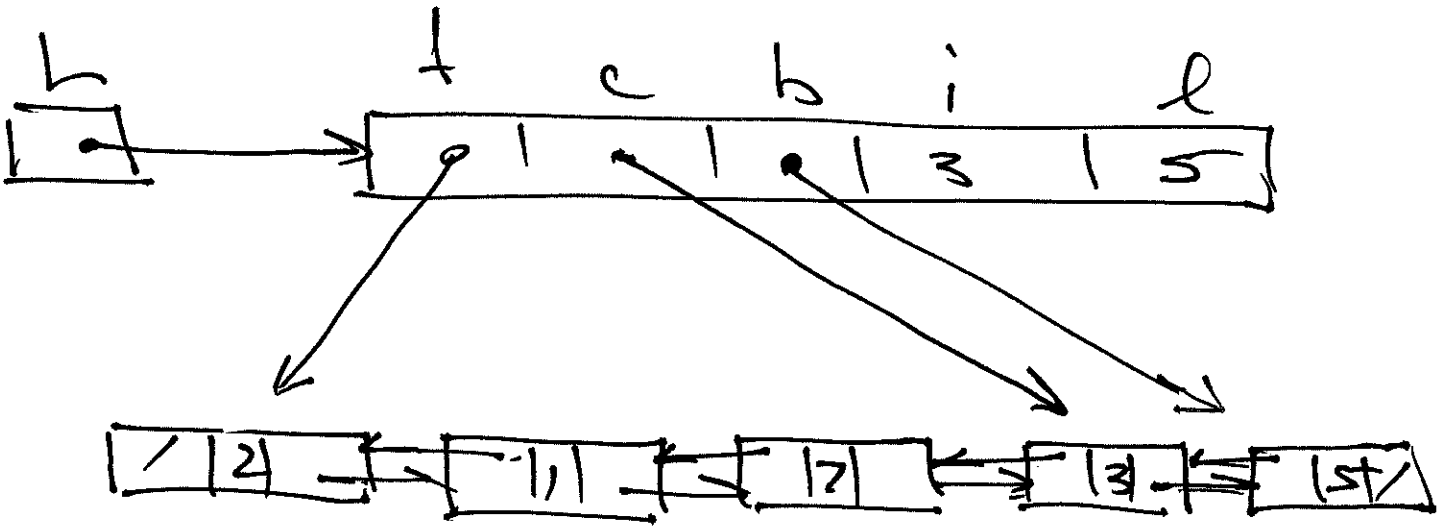


insertBefore(L, 7)

0 1 2 3 4

client view: (2 1 7 3 5)

inside view:



Pair : example

0 1 2 3

A = ("e" "a" "b" "d")

Want L = (1 2 0 3) sub array

start : L = ( ) ( )

insert 0 : L = (0) (e)

insert 1 : L = (0)

L = (1 0) (a c)

insert 2 : L = (1 0)

L = (1 0)

L = (1 2 0) (a b c)

insert 3: L = (1 2 0)

L = (1 2 0)

L = (1 2 0)

L = (1 2 0)

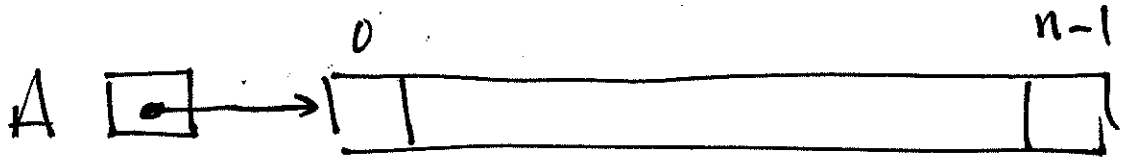
L = (1 2 0 3) (a b c d)

Variable Length Arrays (VLA)

available in ISO c99 and later.

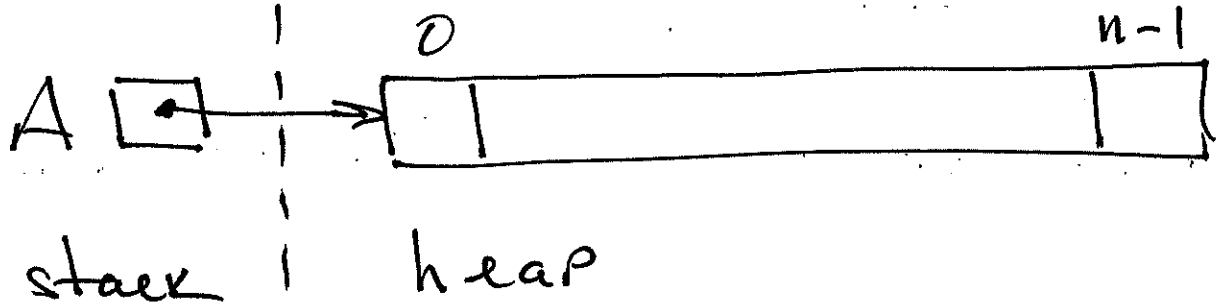
```
int n; // get n from user.
int A[n];
for (int i = 0; i < n; i++) A[i] = Something;
```

Picture:



Don't do this! instead do

```
int * A = calloc(n, sizeof(int))
```




```
free(A);
A=NULL;
```

Graphs

Defn

A Graph $G=(V,E)$ is an ordered pair of sets

- $V \neq \phi$ (vertices)
- $E \subseteq V^{(2)} = \{2\text{-ssets of } V\}$ (edges)

so $e=\{x,y\}$ is an unordered pair of vertices

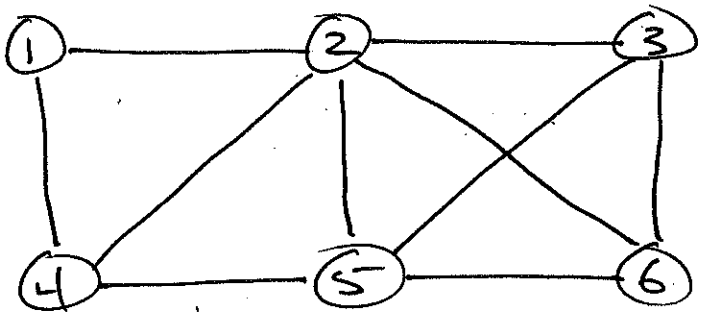
$e=\{x,y\} = xy$

$=\{y,x\} = yx$

Ex.

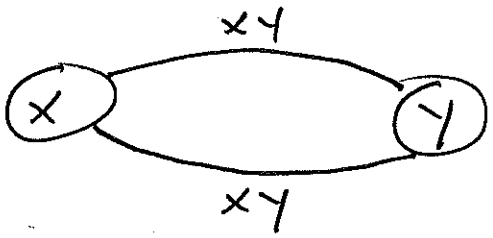
$V(G) = \{1, 2, 3, 4, 5, 6\}$

$E(G) = \{12, 14, 23, 24, 25, 26, 35, 36, 45, 56\}$



- 1 is adjacent to 2
- 12 is adjacent to 25
- 2 is incident with 24
- 3 and 5 are the ends of 35
- 35 joins 3 to 5

note: impossible:



$xx = \{x, x\} = \{x\}$

Defn Let $u, v \in V(G)$. a u-v walk in G is a seq.

length $= k$

$$u = x_0, x_1, x_2, \ldots, x_{k-1}, x_k = v$$

in which each consecutive pair $\{x_i, x_{i+1}\}$ $(i = 0, \ldots, k-1)$ are adjacent, i.e.

$$\{x_i, x_{i+1}\} \in E(G)$$

Ex.

1-6 walk : 1, 2, 3, 2, 3, 5, 4, 2, 6

length = 8

A walk is <u>closed</u> if $u = v$

<u>Defn</u>

A u-v <u>trail</u> is a walk in which no edge is traversed twice or more.

<u>Ex.</u>

1-6 trail : 1, 2, 5, 4, 2, 3, 6

length = 6

Defn

A $u-v$ Path in G is a $u-v$ trail in which no vertex is visited more than once (unless closed)

Ex. 1-6 Path: 1, 2, 4, 5, 3, 6

length = 5