

ENAS 10 : 10-1-09

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Recall :

SEQUENTIAL :

Variable  $\leftarrow$  expression

get variable

Print expression

CONDITIONAL :

if

if - else

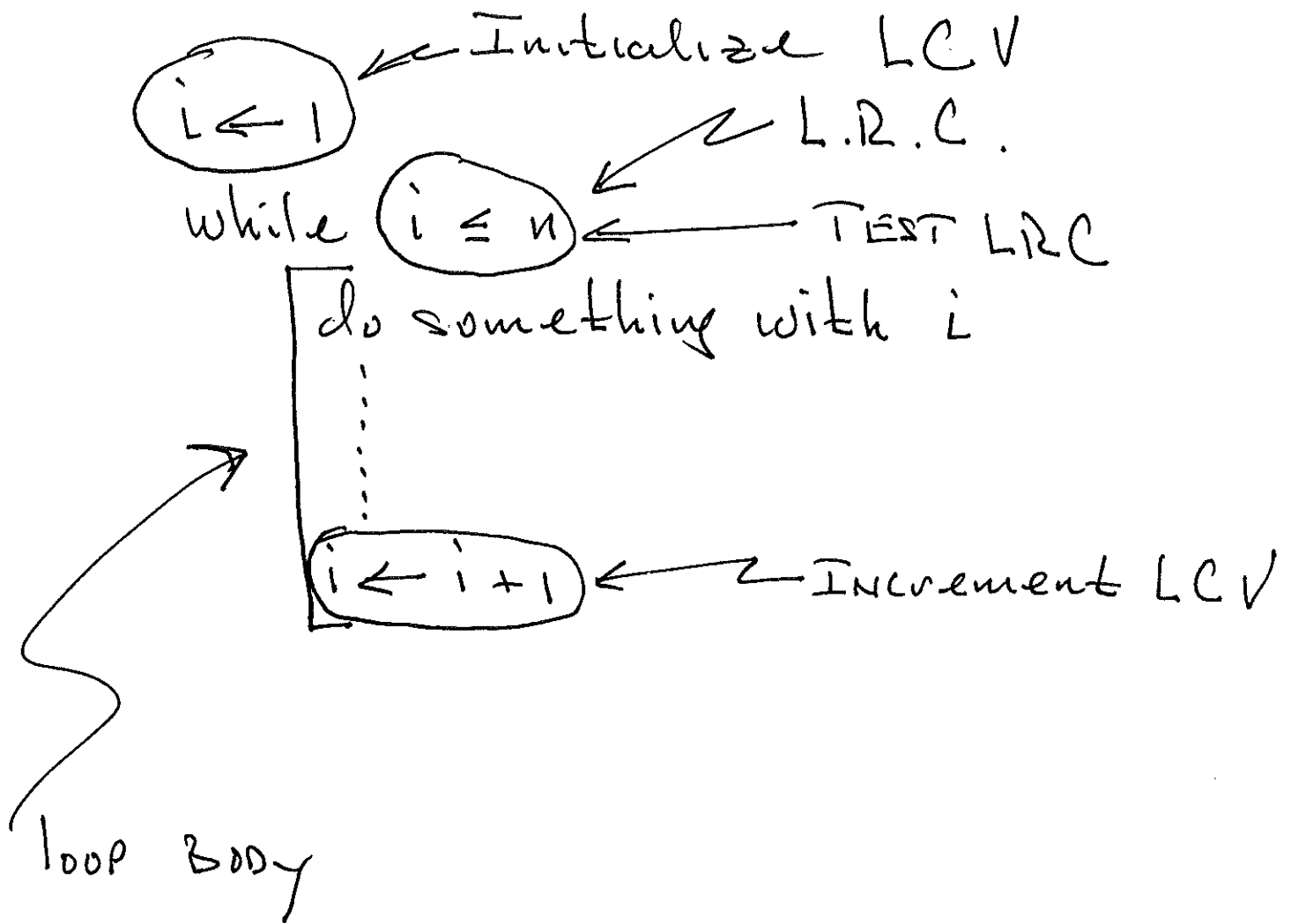
ITERATIVE :

while

do - while

for

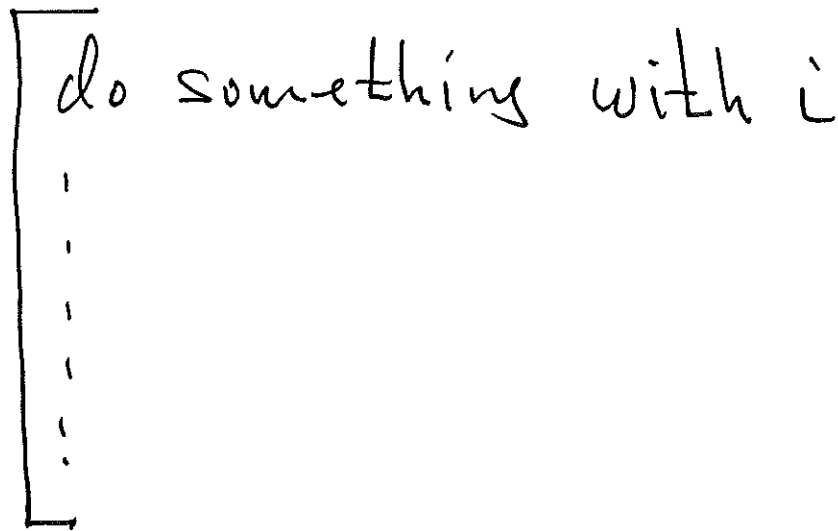
Typical form of a while loop



$i$  is called the loop control variable (LCV)

EQUIVALENT for loop:

for  $i \leftarrow 1$  to  $n$



EX.

- 1.)  $i \leftarrow 1$
- 2.) while  $i \leq 5$
- 3.) Print  $i^2$
- 4.)  $i \leftarrow i + 1$
- 5.) Print  $i$
- 6.) stop

TRACE

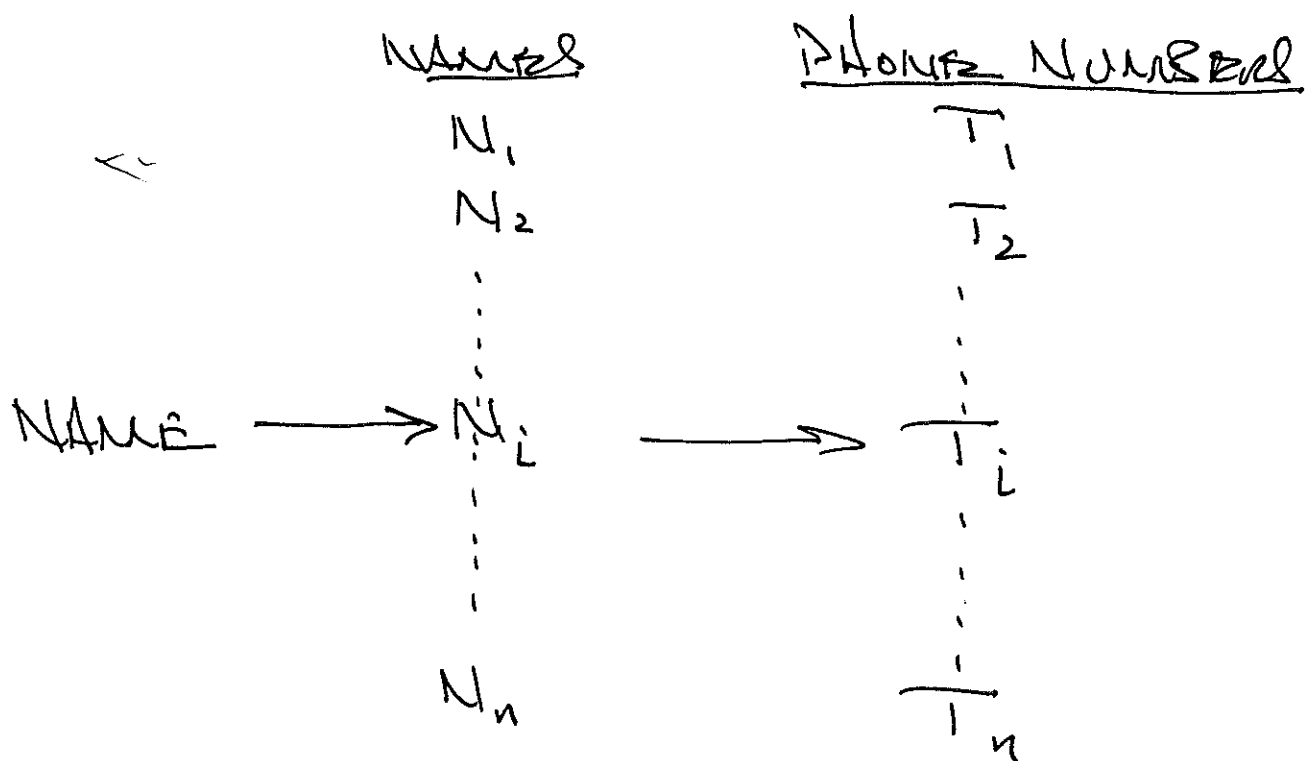
$i$   
 +  
 2  
 3  
 4  
 5  
 6

PICTURE OF OUTPUT: 1 4 9 16 25 6

Ex

- 1.) for  $i \leftarrow 1$  to  $s$
- 2.) [Print  $i^2$
- 3.) Print  $i$
- 4.) stop

Ex. Problem: look up a name in a Telephone Book. (NOT in ALPHABETIC ORDER.)



# SEQUENTIAL SEARCH

[5]

INPUT:  $n \geq 1$  (# of names in list)

$N_1, \dots, N_n$  (the names)

$T_1, \dots, T_n$  (the numbers)

NAME (target name to search for)

OUTPUT: The (first) number  $T_i$  for

which NAME =  $N_i$ , or if no such

name exists, print a message

to that effect.

# Sequential Search

- 1.) get  $n, N_1, \dots, N_n, T_1, \dots, T_n, NAME$
- 2.)  $i \leftarrow 1$
- 3.) found  $\leftarrow$  false
- 4.) while  $i \leq n$  and not found
- 5.)     [ if  $N_i = NAME$
- 6.)         [ found  $\leftarrow$  true
- 7.)         [ print  $T_i$
- 8.)     else
- 9.)         [  $i \leftarrow i + 1$
- 10.) if not found
- 11.)     print 'sorry' NAME 'not found'
- 12.) stop

# LOGICAL OPERATIONS

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PROPOSITIONS: 'today is Wednesday'  
' $6 < 7$ '

NOT PROPOSITIONS: 'hello'  
' $x < 7$ '

LOGICAL VARIABLES:  $A, B, C, \dots$

Also called PROPOSITIONAL VARIABLES,  
since they stand for propositions

• AND (CONJUNCTION)

A	B	A and B
T	T	T
T	F	F
F	T	F
F	F	F

• OR (DISJUNCTION) (inclusive or)

A	B	A or B
F	F	F
F	T	T
T	F	T
T	T	T



• NOT (NEGATION)

A	not A
F	T
T	F

• XOR (exclusive or)

A	B	A XOR B
F	T	T
T	F	T
F	F	F
T	T	F

# Sequential Search (take 2)

(10)

Input:  $n \geq 1, a_1, \dots, a_n, \text{target}$

Output: the first index  $i$  such that  $a_i = \text{target}$ , or 0 if no such  $i$  exists.

1.) get  $n, a_1, \dots, a_n, \text{target}$

2.)  $i \leftarrow 1$

3.)  $\text{found} \leftarrow \text{false}$

4.) while  $i \leq n$  and not found

5.) [ if  $a_i = \text{target}$

6.) [  $\text{found} \leftarrow \text{true}$

7.) else

8.) [  $i \leftarrow i + 1$

9.) if found

10.) print  $i$

11.) else

12.) print 0

13.) stop

Ex.  $n = 5$ , 

$a_1$	$a_2$	$a_3$	$a_4$	$a_5$
<del>3</del>	-1	2	5	12

target = 2

<u>i</u>	<u>found</u>
x	f
2	T
<u>3</u>	

↓  
Print 3