CS118 – Programming Fundamentals

Lecture # 05
Tuesday, August 27, 2019
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FAST – NUCES, Faisalabad Campus

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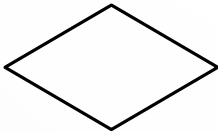
Flowchart Common Symbols

Name	Symbol	Use in flowchart
Oval		Denotes the beginning or end of the program
Parallelogram		Denotes an input
Rectangle		Denotes a process to be carried out (e.g. addition, subtraction etc.)
Diamond		Denotes a decision (or branch) to be made. The program should continue along one of two routes. (e.g. IF/THEN/ELSE)
Hybrid		Denotes and output operation
Flow Line		Denotes the direction of logic flow in the program

Looping flowchart

While condition is true
    Process step(s)
Loop
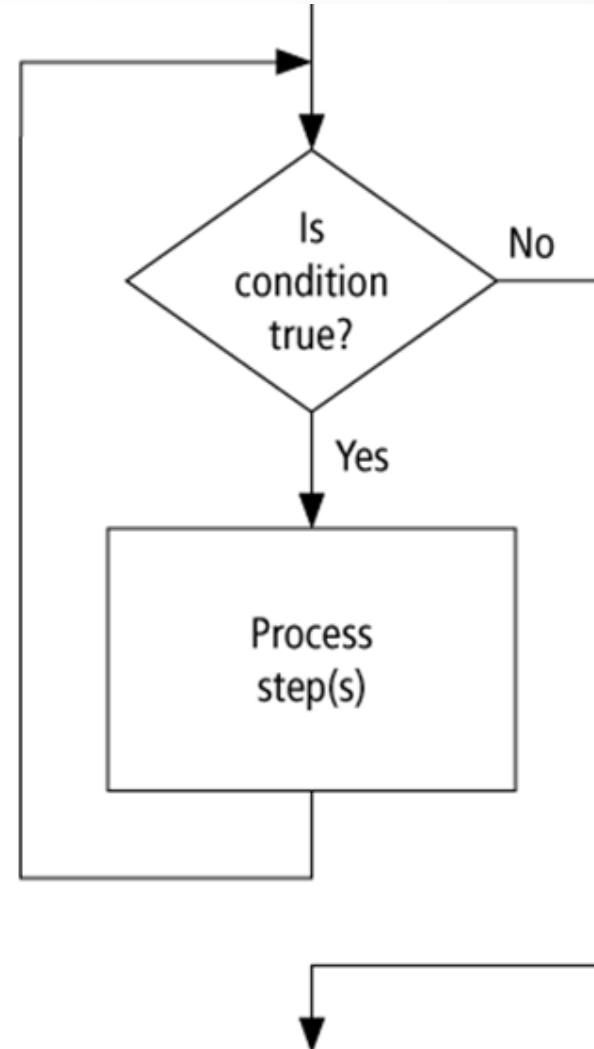
The Repetition Structure

- In flowcharting one of the more confusing things is to separate selection from looping
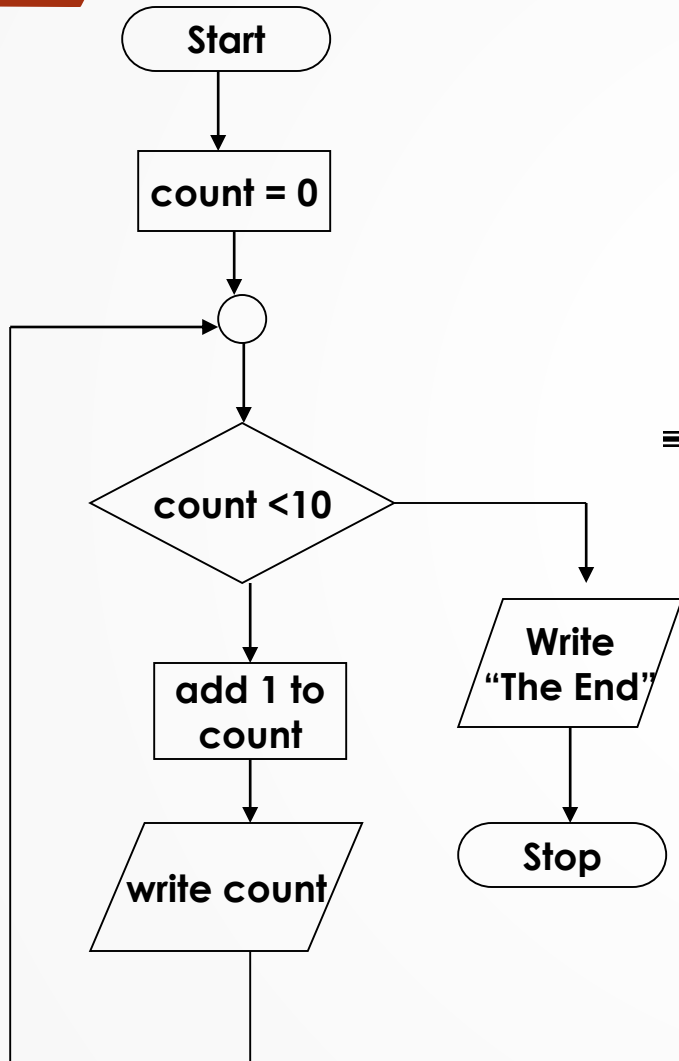- This is because both structures use the diamond as their control symbol
- In pseudocode we avoid this by using specific keywords to designate looping

WHILE/ENDWHILE
REPEAT/UNTIL

WHILE / ENDWHILE

```
Start
  ↓
count = 0
  ↓
  ○
  ↓
count <10 ──→ Write "The End" ──→ Stop
  ↓
add 1 to count
  ↓
write count
```

count = 0
WHILE count < 10
    ADD 1 to count
    WRITE count
ENDWHILE
WRITE *"The End"*

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Mainline
count = 0
WHILE count < 10
    DO Process
ENDWHILE
WRITE *"The End"*

Process
ADD 1 to count
WRITE count

REPEAT/UNTIL

```
Start
   |
count = 0
   |
   O <----+
   |      |
add 1 to  |
count     |
   |      |
write count
   |      |
count <=10 --+
   |
Write "The End"
   |
```
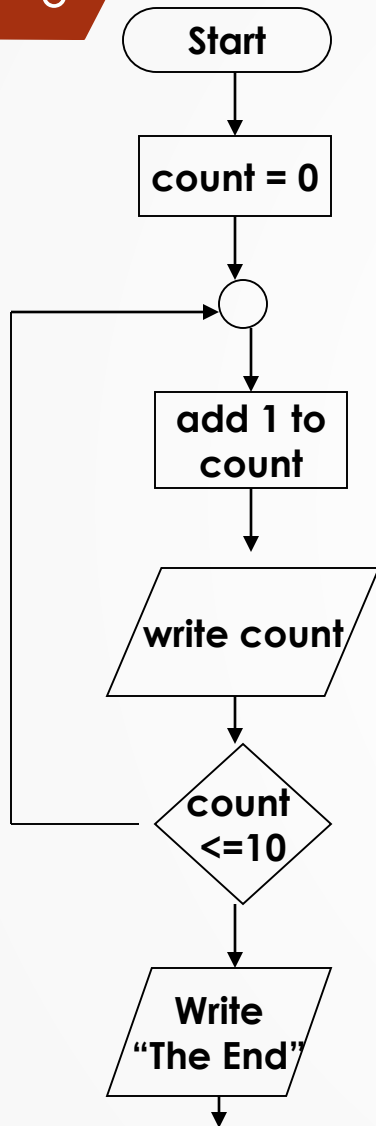
count = 0
REPEAT
    ADD 1 to count
    WRITE count
UNTIL count <= 10
WRITE *"The End"*

══

Mainline
count = 0
REPEAT
    DO Process
UNTIL count >= 10
WRITE *"The End"*

Process
ADD 1 to count
WRITE count

Exercise Programs using Loop Structures

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Exercise Program 1

➤ Write pseudocode and draw a flowchart that will
➤ Print first 10 odd numbers starting from the number provided by the user.
➤ If it is even number then start from the next odd number if it is odd number then start with the current number

- ➤ E.g. the user input 10 then the out put will be
  - ➤ 11 13 15 17 19 21 23 25 27 29
- ➤ If the user input 5 then the output will be
  - ➤ 5 7 9 11 13 15 17 19 21 23
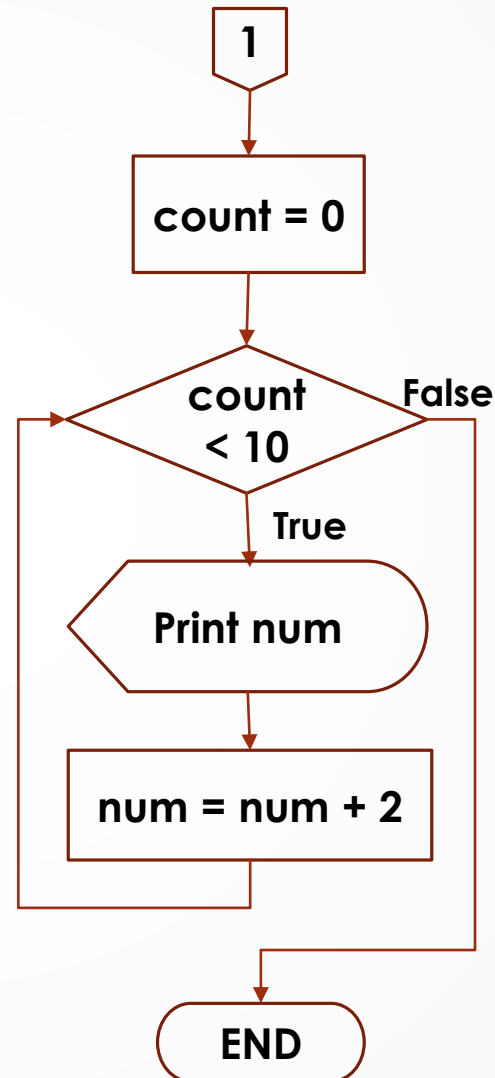
➤ Hint: Use number mod 2 = 0 to determine the even number

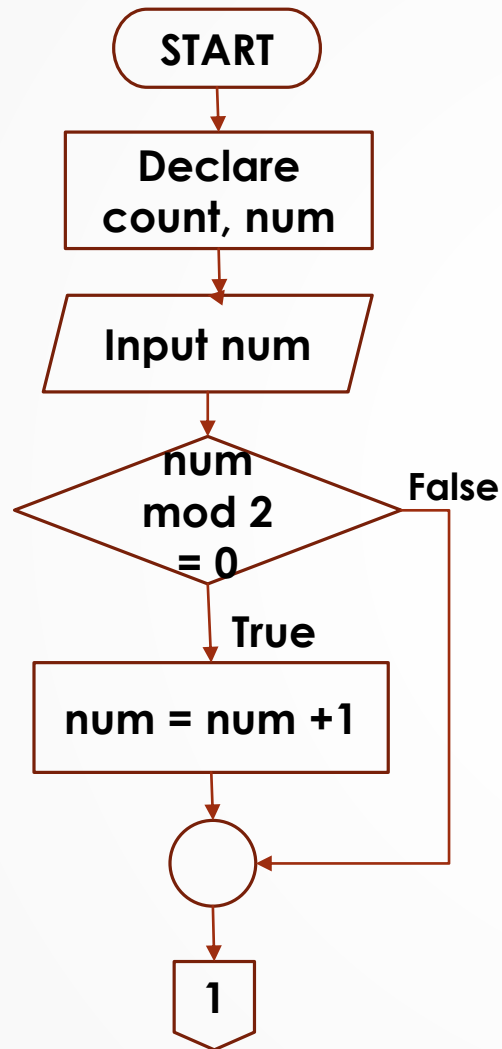# Pseudocode for printing 10 of numbers

1. START
2. declare count, num
3. input num
4. if num mod 2 = 0 then
    4.1 num = num + 1
5. end if
6. count = 0
7. while count < 10
    7.1 print num
    7.2 num = num + 1
    7.3 count = count +1
8. end while
9. END

Flow chart for prtinting 10 odd numbers

Exercise Program 2

- Write a pseudocode and draw a flowchart to
- Read an employee number (EMPNO), employee name (NAME), overtime hours worked (OVERTIME), hours absent (ABSENT) and
- Determine the bonus payment (PAYMENT) for 10 employees one by one

Bonus Schedule	
OVERTIME – (2/3)*ABSENT	Bonus Paid
>40 hours	$50
>30 but ≤ 40 hours	$40
>20 but ≤ 30 hours	$30
>10 but ≤ 20 hours	$20
≤ 10 hours	$10

Exercise Program 3

- Write a pseudocode and draw a flowchart to
- Read an employee number (EMPNO), employee name (NAME), overtime hours worked (OVERTIME), hours absent (ABSENT) and
- Determine the bonus payment (PAYMENT)
- The program will keep on taking input and calculating until the user enters a –ve EMPNO

Bonus Schedule	
OVERTIME – (2/3)*ABSENT	Bonus Paid
>40 hours >30 but ≤ 40 hours >20 but ≤ 30 hours >10 but ≤ 20 hours ≤ 10 hours	$50 $40 $30 $20 $10

Exercise Program 4: Average

➡ Write a pseudocode and draw a flowchart
➡ that will get 10 numbers from the user and print their average.
➡ Use only one number as input i.e. n1

➡ **Hint:** Use loop to get input in n1 and add it to Sum.

Exercise Program 5: Square/cube

- Write a pseudocode and draw a flowchart for a program that will
- Get one number from user
- Print its square if it is an even number
- Print its cube if it is and odd number
- The loop will end if the provided number is a –ve number (Do not print square or cube of this –ve number)

Questions