PROGRAMMING FUNDAMENTALS

BSE: 1st Semester (PUCIT)

10/1/22

- Every Thursday Quiz (1:2:30)
- Monday Lab (2:30 ~ 5:30) 197 (sir)
  - (TA) F20M
- Dennis Ritchie (C), Bejarne Stroustrup (C++)
- Programming → (Recipies for computer)
- Two parts :- Pseudo (talk)
  - → Planning / Programming / coding
  - → feed → Computer.
- Three situation.
  - (1) Sequence (2) Disturbed / selection
  - (3) Cycle / Loop / Repitions
- Input, Print, *, +, -, /, Declare.
- Oven (CPU), (RAM) Kitchen top : Utensils.
- Syntax and logic. (man can fly).
- console / Screen.
- Sample Pseudo code: (Four numbers and Display sum)

1- Declare num1, num2, num3, num4
2- Print "Enter first Number : "
3- Input num1

:. Print is (constant)
:. No verb as variable.

10- Declare sum
11- Sum = num1 + num2 + num3 + num4
12- Print "Sum of Four numbers", Sum / Print Sum.

:- (a+b) * c/d

⊙ helloWorldAbc (Camel Notation)

⊙ Declare radius
Print "Enter radius"
Input radius
Print "Area of circle", radius * radius * 3.14

⊙ Pseudo Code:-

Pay of employees. hours worked rate per hour

Code:

1- Declare hourWorked, ratesPerHour
2- Print "Enter hours worked:"
3- Input hourWorked
4- Print "Enter rates per hour:"
5- Input ratesPerHour
6- Print "Salary of employee :", hourWorked * ratesPerHour

Devise Solution of the Following Problems using Pseudo Code

⊙ Problem #1:

Input four numbers and display sum of these numbers.

Pseudo Code

```
1- Declare num1, num2, num3, num4
2- Print "Enter first number: "
3- Input num1
4- Print "Enter second number: "
5- Input num2
6- Print "Enter third number: "
7- Input num3
8- Print "Enter fourth number: "
9- Input num4
10- Declare Sum
11- Sum = num1+num2+num3+num4
12- Print "Sum of four numbers: ", Sum
```

⊙ Problem #2:

Input marks of five subjects of a student and calculate its average.

Pseudo Code

```
1- Declare eng, urdu, chem, phy, maths
2- Print "English Marks: "
```

3- Input eng
4- Print "Urdu Marks : "
5- Input urdu
6- Print "Chemistry Marks : "
7- Input chem
8- Print "Physics Marks : "
9- Input phy
10- Print "Mathematics Marks : "
11- Input maths
12- Declare Sum
13- Sum = eng + urdu + chem + phy + maths
14- Declare average
15- average = Sum / 5
16- Print "Average of five subjects", average

⊙ Problem # 3:

Input radius of circle and calculate its area.

Pseudo Code

1- Declare radius
2- Print "Enter radius : "
3- Input radius
4- Print "Area of Circle", radius * radius * 3.14

⊙ Problem # 4:

Take input from user about temperature in Celsius and display on screen the equivalent Fahrenheit temperature.

Pseudo Code

1- Declare tempCelsius , tempFahren
2- Print " Enter temperature in Celsius : "
3- Input tempCelsius
4- tempFahren = (9/5) * tempCelsius +32
5- Print " Temperature in Fahrenheit : ", tempFah

⊙ Problem # 5:

Calculate the pay of an employee, given the hours worked and rate per hour.

Pseudo Code

1- Declare workingHour, ratesPerHour
2- Print " Enter Working Hour : "
3- Input workingHour
4- Print "Enter rates per hour : "
5- Input ratesPerHour
6- Print" Pay of employee : " workingHour * ratesPerHour .

⊙ Problem # 6:

A painter wants to know.....

Pseudo Code

1- Declare length , width
2- Print " Enter Length : "
3- Input length
4- Print " Enter width : "
5- Input width
6- Declare areaOfRectangle

Pseudo Code

1- Declare tempCelsius, tempFahren
2- Print "Enter temperature in Celsius:"
3- Input tempCelsius
4- tempFahren = (9/5) * tempCelsius + 32
5- Print "Temperature in Fahrenheit:", tempFahren

⊙ Problem #5:

Calculate the pay of an employee, given the hours worked and rate per hour.

Pseudo Code

1- Declare workingHour, ratesPerHour
2- Print "Enter Working Hour:"
3- Input workingHour
4- Print "Enter rates per hour:"
5- Input ratesPerHour
6- Print "Pay of employee:" workingHour * ratesPerHour.

⊙ Problem #6:

A painter wants to know....

Pseudo Code

1- Declare length, width
2- Print "Enter Length:"
3- Input length
4- Print "Enter width:"
5- Input width
6- Declare areaOfRectangle

12/2/22

(1) If Faheem Mark >= 950

1.1 Bike

1.2 Dinner

1.3 Marriage

(2) If Sajid get admitted in K.E

2.1 ...

2.2 ...

2.3 ...

Otherwise

2.1 ....

(3) If Abdullah >= 1000

3.1 ...

3.2 ....

Otherwise If Abdullah >= 900

3.1 ....

3.2 ....

⊙ Selection:

⊙ Logical and Syntax error.

⊙ Program : :- alphanumeric by string.

Name input, Greetings

Pseudo code

1- Declare name

2- print "Enter name:"

3- Input name

4- Print "Hello", name

Arithmetic		Relational operators	
⊕	+	>	Input
	-	<	Print
	/	>=	Declare
	*	<=	If
	%	!=	Otherwise
		==	AND OR

3 5
a % b = 2

5- If (name == "aslam")

5.1 Print "Boss"

6- Print "The End"

Otherwise

5.1 Print "Not a Boss"

5.1 Print "Boss"

5.2 Declare coffeeOption

5.3 Print "Do you want coffee Yes/No"

5.4 Input CoffeeOption

5.5 If (CoffeeOption = "Yes")

5.5.1 - Print "Have a coffee".

⊗ IF ____

x.1

x.2

⊗ IF (____)

x.1

x.2

Otherwise

x.1

x.2.

⊗ IF ( )

x.1

x.2

x.3 IF(__)

x.3.1

x.3.2

alphanumeric : double quoted

Program 1:

Age & Eligible & Not-Eligible.

Pseudo Code

```
1- Declare age
2- Print "Enter age : "
3- Input age
4- IF (age >= 18)
     4.1 Print "Eligible for license"
   otherwise
     4.1 Print "Not eligible for License"
```

Program 2:

Day

Pseudo Code

```
1- Declare integer
2- Print "Enter integer value representing day : "
3- Input integer
4- IF (integer == 1)
     4.1 Print "Monday"
5- IF (integer == 2)
     5.1 Print "Tuesday"
6- IF (integer == 3)
     6.1 Print "Wednesday"
7- IF (integer == 4)
     7.1 Print "Thursday"
8- IF (integer == 5)
     8.1 Print "Friday"
9- IF (integer == 6)
     9.1 Print "Saturday"
10- IF (integer == 7)
```

Logical operators
AND
OR

10.1 Print "Sunday"
otherwise
10.1 Print "Number is not between 1-7"

OR

4- If (number == 1)
4.1 - Print "Monday"
otherwise If (number == 2)
4.1 - Print "Tuesday"
otherwise If (number == 3)
4.1 - Print "Wednesday"
{
otherwise
4.1 - Print "sunday".

1- Declare num
2- Input num
3- If (num % 2 == 0)
3.1 - Print "even"
;

a > 10 AND a < 20 (Both true) 10 < a > 20
a == 5 OR a == 10 (Only one true)

⊙ Program:

Largest number:

Pseudo Code

1- Declare num1, num2, num3
2- Print "Enter first number:"
3- Input num1
4- Print "Enter second number:"
5- Input num2
6- Print "Enter third number:"

17/1/22

⊙ $\sum_{i=1}^{N=10} i$, $n/2\,(2a_1 + (n-1)d)$

$(1+2+3+4+5+\cdots+10)$ $\quad N(N+1)/2$ (Gauss formula)

⊙ $\sum_{i=3}^{14} C = 14C$ $\quad \sum_{i=l}^{u} C = (u-l+1)C$

$3 \sim 14$

$14-3+1 = (12)$

$\sum_{i=6}^{N} i$ $\quad N-6+1$ $\quad (N-5)$

18/1/22

⊙ Loop:

Condition true, it keeps on running and it stops when condition is false.

(*) X- Repeat Until (____)

X.1 -

X.2 -

(*) 1- Declare counter

2- counter = 1

3- Repeat Until (counter <= 5)

3.1- Print "Hello"

3.2- counter = counter + 1

(*) 1- Declare num, counter

2- Input num

3- counter = 1

4- Repeat Until (counter <= 10)

Loops

- Impossible
- Easy us

4.1 Print num, "*", counter, "=", num * counter
4.2 - counter = counter + 1

- Until '0' is entered

Pseudo code

1. Declare num
2 - Print "Enter number:"
3 - Input num

4 - Repeat Until (num != 0)
4.1 - Print "Please Enter number :"
4.2 - Input num

- 1 - Declare countofNumbers, num, max
2 - Print "Enter countofNumbers:"
3 - Input countofNumbers
4 - Print "Enter Number :"
5 - Input num
6 - max = num
7 - Repeat Until (countofNumber != 1)
7.1 - Input Num
7.2 - If (max < Num)
7.2.1 - max = num
7.3 - countofNumber = countofNumber - 1
8 - Print "Maximum :", max

- 1 - Declare choice
2 - choice = "y"
3 - Repeat Until (choice == "y")
3.1 - Declare num

19/1/22

⊙ 1- Input nDigit
2- counter = 1
3- Repeat Until(counter <= nDigit)
3.1- Print 9
3.2- counter = counter + 1

⊙ 1- Input nDigit
2- counter = 1 , num = 9
3- Repeat Until(counter <= nDigit)
3.1- num = num * 10 + 9
3.2- counter = counter + 1
4- Print num.

x = 75
x = x * 10 + 8

⊙ 1- Input number
2- num = 0
3- counter = 1
4- Repeat Until(counter <= number)
4.1- num = num * 10 + 9
4.2- counter = counter + 1
5. Print num

⊙ 1- Declare num1, num2, counter = 1, Product
2- Print "Enter number 1:"
3- Input num1
4- Print "Enter number 2:"
5- Input num2
6- Repeat Until (

GCD

- Input numerator, denominator
  Repeat Until (numerator % denominator != 0)
  remainder = numerator % denominator
  numerator = denominator
  denominator = remainder
  Print denominator.

- co-prime - only two numbers divide by 1.
  IF GCD == 1
  then numbers are co-prime.

- Declare height, beans, counter=1, ~~beansCount=0~~
  Print "Enter height :"
  Input height → Print (height * (height+1))/2
  Repeat Until (counter <= height)
  beansCount = beansCount + count
  counter = counter + 1
  Print beansCount

  :- $\frac{N(N+1)}{2}$

- Declare num1, num2, countOfNumbers, counter, ~~a, sum=0, b~~
  Input num1, num2
  Input countOFNumbers
  Repeat Until (counter <= countOfNumbers)
  a = num1 + num2
  sum = sum + a
  num1 = num2
  num2 = a
  b = num1 + num2

3 4 7
7
4
7

- Input noOfTerms
  term1 = 1
  term2 = 2

RAM | Console Screen

otherwise IF (highestscore < judgescore)
10.1- highestScore = judgescore.
13- Print "Enter 3rd Judge Score :"
:

⊙ Loop:-

Condition true, it keeps on running and it stops when condition is false.

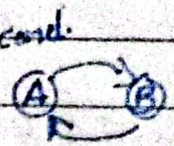
⊙ Print Hello 5 times

1- Print "Hello"
2- Print "Hello"
3- Print "Hello"
4- Print "Hello"
5- Print "Hello"

OR

1- Declare a
2- a = "Hello"
3- Print a
4- Print a
5- Print a
6- Print a
7- Print a

cond.



⊕ X- Repeat Until (_____)

X.1 -
X.2 -

⊕ 1- Declare counter
2- Counter = 1
3- Repeat Until (counter <= 5)
3.1- Print "Hello"
3.2- Counter = counter + 1

:- Counter = 1 2 3 4 5 6 x
:- 5 times loop.

⊕ 1- Declare num, counter
2- Input num
3- Counter = 1
4- Repeat Until (counter <= 10)
4.1- Print num, "*", counter, "=", num * counter
4.2- Counter = Counter + 1

26/1/22

⊙ Div = 1

2. Repeat Until (num1 != 0)

2.1 - num = num % 10

2.2 - Div = Div * 10

* Nested loop :-

(A) ⊙ Pasitive Number :

Pseudo Code

1- Declare num1, num2, sum

2- Print "Enter 1st number:"

3- Input num1

4- Repeat Until (num1 <= 0)

4.1 - Print "Enter 1st number again"

4.2 - Input num1

5- Print "Enter 2nd number:"

6- Input num2

7- Repeat Until (num2 <= 0)

7.1 - Print "Enter 2nd number again"

7.2 - Input num2

8- sum = num1 + num2

9- Print "Sum of two numbers is:", sum

⊙ 1- Declare choice

2- choice = "y"

3 - Repeat Until (choice == "y")

3.1 (A)

3... Print "Press Y to continue"

3... Input Choice

:- Variables will be finished which are present in loop.

:- Ruthless negativity

① $1^2 + 2^3 + 3^4 + 4^5 + 5^6 \ldots\ldots$

Pseudo Code

1- Declare base, exp, counter, result
2- Input base, exp
3- counter = 1 , result = 1
4- Repeat Until (counter <= exp)
  4.1- result = result * base
  4.2- counter = counter + 1
5- Print result

② 1- S = 1 , sum = 0
2- Repeat Until (S <= N)
  2.1 Declare base, exp, cnt, result
  2.2- base = S , exp = S + 1
  2.3- cnt = 1
  2.4- result = 1
  2.5- Repeat Until (cnt <= exp)
    2.5.1- result = result * base
    25.2- cnt = cnt + 1
  2.6- sum = sum + result
  2.7- S = S + 1

③ (a AND B) > C

1st priority

2	17
2	8 - 1
2	4 - 0
2	2 - 0
	1 - 0

Always 4 ↑