18/11/20

ALGORITMS AND FLOWCHARTS

A Typical programming task can be divided into two phases. Problem solving phase and implementation phase.

→ Problem solving phase

Produce an ordered sequence of steps that describe solution of problem.

this sequence of steps is called an algorithm.

→ Implementation phase

Implement the programme is some programming language.

steps in problem solving

→ First Produce a general algorithm (one can use pseudocode)

→ Refine the algorithm successively to get step by step detailed algorithm and that is very close to a computer language

→ Pseudocode is an artificial and informal language that helps programmers develop algorithms. pseudocode is very similar to everyday english.

Algorithm for Addition of two numbers.

start

step 1 : Put two number a and b

step 2 : let s = a+b

step 3 : print "sum is", s

stop.

{Heres, a & b are variable}

Substraction of two numbers

step 1 : input two numbers a and b
step 2 : let d = a-b
step 3 : print "difference is", d

Product of a two numbers

step 1 : input two numbers a and b
step 2 : let p = a x b
step 3 : print "product is", p

quotient of two numbers

step 1 : input two numbers a and b
step 2 : let q = a % b (/)
step 3 : print "quotient is", q

Reminder of two numbers

step 1 : input two numbers a and b
step 2 : let r = a % b
step 3 : Print "reminder is", r

Variable

→ Variable is an entity or an identifier whose value changes during program execution.

Algorithm for Simple Calculator

Start

step 1 : input two numbers a and b
step 2 : sum = a+b
step 3 : difference = a-b
step 4 : product = a×b
step 5 : quotient = a/b
step 6 : reminder = a%b
step 7 : print "sum is", s
step 8 : print "difference is", d
step 9 : print "Product is", p
step 10 : print "quotient is", q
step 11 : print "reminder is", r

Stop

25/11/2020 Wednesday

Simple Calculator (SIMPLE CALCULATOR)

Start
step 1 : input two numbers a and b
Step 2: sum = a+b
Step 3: difference = a-b
Step 4: product = a×b
Step 5: quotient = a/b
Step 6 : remainder = a%b
Step 7: Print "sum is", sum
Step 8: print "difference is", difference
Step 9: Print "Product is", Product
Step 10: print Quotient is", quotient
Step 11: print remainder is", remainder
Stop

Algorithm

→ Step by step procedure to solve a programme/problem
→ It is written in English like sentences or words known as pseudocode.

Algorithm for average of three numbers

1. Start
2. Input three numbers a,b,c
3. Sum = a+b+c
4. Avg = $\frac{sum}{3}$
5. Print a,b,c,sum,Avg.

Temparature conversion

$$F = 1.8C + 32.0$$

celcius temparature to fahrenheit temparature

1. Start
2. Input C
3. F = 1.8*C + 32.0
4. Print "celcius temparature is", C
5. Print "fahrenheit temparature is", F
6. Stop

Area of a circle

$$area = \pi r^2$$

1. Start
2. Input r
3. Pi = 3.14 (π)
4. Area = Pi * r * r
5. Print area
6. stop

Area of a triangle

a,b,c are three sides of a triangle. The lines followed by the hash symbol (#) are comment lines.

/* comment lines */ in C

comment lines are used for documentation or beautification purposes.

Area of a triangle

1. Start
1'. import math
2. input a,b,c
3. $s = \frac{(a+b+c)}{2}$
4. A = sqrt((s*(s-a)*(s-b)*(s-c)))

$$area = \sqrt{s(s-a)(s-b)(s-c)}$$

$A = (s*(s-a)*(s-b)*(s-c))^{*0.5}$

() are known as paranthesis

5. print "Area =", A
6. stop

Volume of a cylinder

1. Start
2. input r,h
3. pi = 3.14
4. V = pi*r*r*h
5. print "Volume =", V
6. stop

$$Volume\ V = \pi r^2 h$$

convert Rupees to paise

1. start
2. input rupees
3. Paise = Rupees*100
4. print "Rupees =", Rupees
5. print "Paise =", Paise
6. stop

2/12/20

constant

A constant is an entity or an identifier whose value remains the same, through out program

A given number is odd or even.

- 1. start
- 2. input a number, n
- IF (n%2 == 0)

  Print n, "is even"

  else

  Print n, "is odd"
- stop

T = (2m1m2 / (m1+m2))*g

1. start
2. input m_1, m_2, g
3. $T = ((2*m_1 m_2) / (m_1+m_2)) * g$
4. Print T
5. stop

→ ' ' '

This is a multi line comment in python test your self

' ' '

Value

Self

A simple model of a computer.

It is concerned with

a) Acquisition of data
b) storage of data
c) Organization of data
d) processing of data
e) Output of processed data (information for application/use)
f) Dissemination or distribution of information.

Machine to be Versatile data Processing machine if

→ Able to acquire or read data of all five types (numbers, text, images, audio and video) and also be able to read instructions to process the data.

→ Have a facility to store and organize the data.

→ Be able to process data (data is processed by interpreting and executing a set of instructions called program, stored in machines primary memory unit)

→ Have devices to output the processed data.

→ Easily connectable to other computers using communication networks for widely disseminating information.

Input system

→ Used to acquire data from external world and convert it into a form which can be stored in it's storage system.
eg:- Key board, video, cameras, microphones, scanners, etc.

Memory System

→ Program for processing data and the data to be processed are stored.

→ Ram RAM --- which is the primary memory used to store instructions and data to be processed.

→ Basiders RAM, a variety of interconnected units such as FD's, HD's, CDROMS, DVDROMS, flash memory, and magnetic tape drives. ---
SECONDARY MEMORY

Memory

→ 1 byte - 8 bits
→ 1024 bits - 1 KB
→ 1024 KB - 1 MB
→ 1024 MB - 1 GB
→ 1024 GB - 1 TB (Terra Byte)
→ 1024 TB - 1 PB (Peta Byte)
→ 1024 PB - 1 EB (Exa Byte)

Processing system.

→ Heart of the machine and is designed to interpret and execute instructions of a program stored in the memory.
→ Variety of processing systems.
→ Eg:- Simplest ones – MW ovens, Washing m/cs
→ Faster power ful processors – complex
→ mathematical calculations.
→ DSPs .... process audio and video data.
→ Now several processing units.

COMPILER

→ Reads the whole program and converts it into the machine code.

Interpreter INTERPRETER

15/12/20 Tuesday

→ Read data line by line and executes it one by one

Out put system

→ Prints or displays the results of data processing

Eg:- Video displays, inkjet printers, loud speakers and laser printers.

Network interface Unit.

→ To connect it to a communication system and through this to other computers.

Data processing using a computer.

→ Analyse the given data processing task and understand what is to be done.

→ find a method to do it.

→ Express a method of a algorithm, It is a step by step procedure which is called algorithm.

→ Express the algorithm using a precise notation called a programming language - computer pgm.

→ Programs can be interpreted and executed by a computer's processing system.

→ input the programme to be executed and store it in the memory of the computer.

→ Order the computer to start executing the program.

→ The computer interprets the programe stored in it's memory

→ At the end of the program being executed [during the execution of a program]. an introduction will be found to write the results via the output unit.

→ It may also send the results to another computer connected to it.

Adition Algorithm.

→ once an algorithm is written, it may be used for all tasks of the same type.

→ this called data independance of an algorithm.

→ The computer metal we used so far was first proposed by **John Von Neumann** in 1945

→ The major contribution is the idea of storing the program in the memory and executing it by taking one instruction at a time.

→ storing a program in memory is essential if a series of instructions are to be executed repeatedly.

→ storing the program in memory also makes the operation of computers automatic (unlike a simple pocket calculator)

16/12/20 Wednesday

Desktop computer.

→ The best way to learn a computer is to start using it as early as possible.

→ Various parts of a desktop computer (commonly known as IBM PC compatible)

keyboard

→ Similar to typewriter keyboard with some extra keys called control keys and function keys..... input unit.

Video display unit.

→ Display pictures with reasonably good resolution.

→ Display icons which assist you to give command to the computer. (GUI -- Gooyee)

→ The most common O/p unit.

16/12/20 Wednesday

⇒ The expressions involving relational operators are known as relational expressions.

→ The output of relational expressions is True or false

A = 10
B = 6

IF (A == B) - - - FALSE

IF (A < B) - - - FALSE

IF (A > B) - - - TRUE

IF (A != B) - - - TRUE

IF (A >= B) - - - TRUE

IF (A <= B) - - - FALSE

A given number is odd or even

1. start
2. input a number, n
3. IF (n % 2 == 0)

   Print "Given number is" EVEN"

   else

   Print "Given number is ODD"

Exchange of values b/w two variables (swapping)

1. Start
2. input a, b
3. print a, b
3. temp = a

   a = b

   b = temp
4. Print a, b
5. Stop.

Largest of two numbers a and b

1. Start
2. Input a and b
3. If it (a > b)
   Print "Largest is; a"
   else
   Print "Largest is b"
4. stop.

Largest of three numbers.

1. start
2. input a, b, c
3. largest = a
4. If (b > largest) and (b > c)
   Print "Largest is b"
   else
   if (c > Largest) and (c > b)
   Print "Largest is c"
   else
   Print "Largest is a"
5. Stop.

Logical operators.

and ... ~~Faure~~ TRUE if both relational expressions are TRUE

or .... TRUE if any one of the relational expressionals are TRUE

not .... TRUE becomes FALSE and FALSE becomes TRUE

Largest of three Numbers

1. Start
2. Input a, b, c
3. Largest = a
4. If (b > Largest)
   Largest = b.
5. If (c > Largest)
   Largest = c.
6. Print "Largest is". Largest
7. Stop.

OR

1. Start
2. Input a, b, c
3. If (a > b)
   if (a > c)
   Print "Largest is", a
   else
   Print "Largest is", c
   else
   if (b > c)
   Print "Largest is". b
   else
   Print "Largest is", c
4. Stop

6/4/2021

GRADE OF A STUDENT

The mark in 4 subjects of a student is given find out the grade of the student.

Avg marks	Grade
>= 90	OUTSTANDING
< 90 and >= 80	Very good
< 80 and >= 70	Good
< 70 and >= 60	Average
< 60 and >= 50	Satisfactory
< 50	fail.

Algorithm.

1. start
2. input m1, m2, m3, m4
3. avgm = (m1 + m2 + m3 + m4) / 4
4. if (Avgm >= 90)

```
Print ("outstanding")
else if (avgm < 90) and (avgm >= 80)
 Print ("very good")
 else if (avgm < 80) and (avgm >= 70)
  Print ("good")
  else if (avgm < 70) and (avgm >= 60)
   Print ("Avarge")
   else if (avgm < 60) and (avgm >= 50)
    Print ("satisfactory")  else Print ("Failed")
```

5. stop.

If and else if statements occuring in this fashion are called else if ladder.

1. Algorithm to find the roots of a quadratic equation

$ax^2 + bx + c = 0$

Discriminant $D = \sqrt{(b^2 - 4ac)}$

roots = $(-b \pm (\sqrt{D})) / 2 * a$

if $(D < 0)$ = roots are imaginary.

if $(D == 0)$ = there is one root $-b/2a$

if $(D > 0)$ = there are two roots

$x_1 = (-b + \sqrt{(D)}) / 2 * a$ and

$x_2 = (-b - \sqrt{(D)}) / 2 * a$.

$x_1 = (-b \pm \sqrt{(D)}) / 2 * a$ and

$x_2 = (-b \pm \sqrt{(D)}) / 2 * a$.

Algorithm

1. Start
2. input a, b, c
3. $D = (b * b - 4 * a * c)$
4. If $(D < 0)$

Print ("Roots are Imaginary")

else if $(D == 0)$

$x_1 = -b/2 * a$

Print (x_1)

else $x_1 = (-b + \sqrt{(D)}) / 2 * a$

$x_2 = (-b - \sqrt{(D)}) / 2 * a$

Print x1

Print x2

5 Stop

2. Algorithm to print the day of week.

IF (d == 1)

Print ("sunday") and so on.

DESKTOP PC SPECIFICATIONS

1. 7th generation intel core i5, Process a 6M cache
2. intel chip 110 chipset on OEM (original equipments manufacturer) motherboard.
3. 8 GiB DDR4-2133 MHZ RAM (Double Data Rate)

DESKTOP PC SPECIFICATIONS

- 4. 1.0TB SATA HARD DISK DRIVE at 7200 rpm
- 5. 16/15.6" LED monitor
- 6. 2GiB graphics card.
- 7. 104 keys USB keyboard
- 8. USB 2. button optical scroll mouse with mouse pad
- 9. Mini tower cabinet with smps (switch mode power supply)
- 10. 24X DVD R/W
- 11. intergrated audio controller
- 12. 10/100/1000 mbps onboard integrated, Network controller with RJ45 port (Registered jack)