02/07/2024

⇒ Binary numbers :

in Computer Science and mathematics, binary is a System where number and Values are expressed by 0 or 1.

Binary is base-2, meaning that it is only uses 2 digits or bits. For Computer, ~~1is~~ 1 is true or "on", and 0 is false or "off".

* The Concept of binary and bits are based on of ~~Boolean algebra~~. Boolean algebra.

| decimal | Binary |
|---|---|
| 0 | 0 |
| 1 | 1 |
| 2 | 10 |
| 3 | 11 |
| 4 | 100 |
| 5 | 101 |
| 6 | 110 |
| 7 | 111 |
| 8 | 1000 |
| 9 | 1001 |
| 10 | 1010 |
| 11 | 1011 |

03/07/2024

## * Boolean Algebra

→ A Branch of MATHEMATICS that deals with operations on logic values with binary variables.

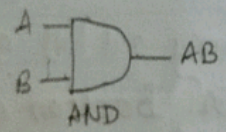
→ also says about :
- × Vaccum Tube ~~Computer~~
- ×
- × transitor
- ×
- × processors. (chip)

and processor contain Billion or trillion number of logic gates.

### logic Gates

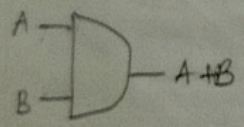
* And gate :

| | | |
|---|---|---|
| 1 | 1 | 1 |
| 1 | 0 | 0 |
| 0 | 1 | 0 |
| 0 | 0 | 0 |



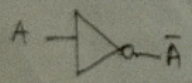

* OR gate :

| | | |
|---|---|---|
| 1 | 1 | 1 |
| 1 | 0 | 1 |
| 0 | 1 | 1 |
| 0 | 0 | 0 |




* NOT gate :

| | |
|---|---|
| 0 | 1 |
| 1 | 0 |

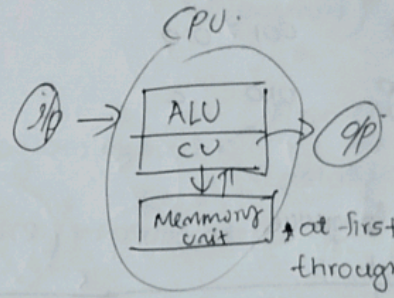



08/07/2024

COMPUTER → Common operating Machine purposely used for Technological and Educational Reserch (Full Form)

CPU → Central prossesing unit

* computer contain an input part, CPU (memory Unit, Arithmetic logic unit & control unit) and an output portion




- mechine languge is at voltage level.

* at first when we enter any problem through the input portion (like keyboard, mouse, etc) then the control unit would store it on the memmory unit

RAM ⇒ Random Access memory.

Registers ⇒ High speed fast axessable memmory

Then the stored information will transfered into the arithmetic logic unit. and 'ALU' contain 'logic gates' Such as AND, OR, NOT, etc. which help ALU to solve the problem we entered. Then after solving this problem Control unit would transfere it into the output source like monitor.

### Assembly language.

it is a low-level programming language and intended to communicate directly with a Computer's hardware.

eg:- * Assembly language for $C = A + B$

| | | |
|---|---|---|
| MOVE | A | $R_1$ |
| MOVE | B | $R_2$ |
| ADD | $R_1$ | $R_2$ |
| STORE | $R_2$ | C |

instruction set.

## Machine language

The lowest level of programming language that directly corresponds to the instructions executed by a Computer's hardware

eg:

| | | |
|---|---|---|
| 001 | A | 001 |
| 001 | B | 010 |
| 011 | 001 | 010 |
| 010 | 010 | C |

## computer language

- low level language (Machine level language)
  - ↓
  - (use '1' & '0' to create instruction)
  - eg: Binary language.
- Middle level language (Assembly language)
  - ↓
  - (use mnemonics to create instructions)
  - Assembly language
- High level language (Similer to human language)
  - eg: Cobol, FORTRAN, Basic C, C++, Java, Python.

17/07/2024

C-DAC => Center for Development of Advanced Computing.

* First Supper Computer of C-DAC => param 8000 (1991)
* Latest Supper Computer of C-DAC => The AI Supercomputer 'AIRAWAT'

23/07/2024

approches to Solve problem

* Top down approch (for Solving bigger problems)
* Bottom Up Approch (for ~~Solving~~ Medicine Testing like problems)

1) Flow diagram method
   - Flow chart
   - flow data diagram
2) Algorithem / ~~pe~~ pseudocode

## Algorithem

* Logical Step by Step method to Solve the problem.

  In other words, an algorithem is a procedure for Solving problem.

* An algorithem includes calculation, reasoning and data processing.

~~Flow Chart~~

## pseudocode

: is defined as a method of describing a process or writting programming code and algorithem using a natural language Such as English. it is not a code by itself but rather a description of what a code Should do.

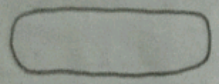
Flowchart

* graphical or pictorial representation of an algorithm with the help of different symbols, shapes, and arrows to demonstrate a process or a program.

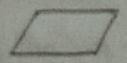
* The main purpose of using a flowchart is to analyse different methods.

Symbolos (flowchart)

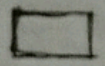
* TERMINAL BOX → Start/END



* input or out put.



* process / instruction.



* Decision.

* Connector

eg:

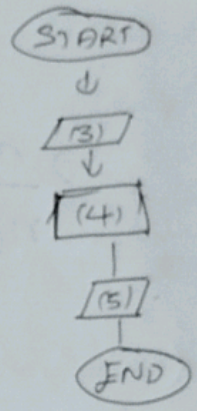
*? Comput the average of 3 numbers.

1) START
2) Declare variables num1, num2, num3, and average.
3) Read the variable num1, num2 num3,
4) Find the average Using the Formula

$$average = \frac{(num1 + num2 + num3)}{3}$$

5) Display average
6) END

~~algorithm~~




29/07/2024

— Artificial intelligence

double bridge

algorithm — deterministic (i/p (clear) o/p (clear))
— non deterministic

$$\frac{n!}{(n-r)!\,r!}$$

Input n, r;

i = 1

input n,r;

A = Fact (n)

B = Fact (r)

C = Fact (n-r)

D = A/B×C

$\frac{n!}{r!(n-r)!}$

Fact (x)

i=1 , S=1

06/08/2024

1- RAM → RANDOM Access memory (Sequencial memmory)

2- Secondary Storage

1) non Volatile

2) Slower than main

contain bits → contain 8 bit

if 8GB The No. bits = $8 \times 10^9$

it is an electronic memory (work only if it has power)

1) So we call it volatile memory

2) Faster than S.M

Registers → 1) faster than main memory

2) Each (cell) capable to contain bit

Registers (approximate 16)

Control unit would control

Move A R, like statement

language transilation → Higher level language to Mechine language

method

1) compilation (consume more memory then interpruter)

2) interpruter (Some memory would consume)

Higher leve

Assembly code (Intermediat)

Require Some amout of storage

in windows,

a.c → compiling → a.exe

in lenux;

a.c → a.out

interpruter Only at the time use pre comment

about Today

1) RAM ⇒ RANDOM Access Memory (ROM) → Read only memory.

* it is also called the main memory or primary memory or Read-write memory.

* it is a temporary memory
* The programs and data that the CPU requires during the execution of a program are stored in this memory.
* It is a volatile memory as the data is lost when the power is turned off. (electronic memory)
* it is faster than Secondary memory
* Ram - capacity is critical for system performance.

⇒ Secondary memory (CD, DVD, hard disk, etc).

* it is a non-volatile memory as the data is not lost when the power is turned off.
* it is slower than main memory

* Registers memory ⇒ the smallest and fastest memory in a computer.
  * it is not a part of main memory
  * located in the CPU.
    in the form of Registors
  * it temperorily holds frequently used data, instruction, and memory address that are to be used by CPU.

Language transilation ⇒ method
- Compiler : • which translate an entire computer program into machine language before execution.
  • consume more memory
- interpreter ; transilate programs one line at a time during execution and no intermediate formed, less memory

13/08/2024

→ int data time limit.
so overcome we use "long int" data type.

int
float
char

only value

19/08/2024

- alphanumeric
- numeral
→ Special characters. ({} () : , > <)

used in C, C++ ← ASCII → American Standered code for information interchange
IscII

→ Unicode

How differentiating photo, video, audio in computer ?
deciding the type style

every file associated with 2 parts that is Heder file and data

F.H → decide → How the data read.

in the data part → Saving the colour of every pixel include

1 bite → 8 bit Contain in one pixel color.

Avoidate representation

How it read by System

int

float

char/string

double

long int

void

boolean.

Struct → user defined datatype.

Union

Control Structure

if, while, for, goto, switch

Assignment ÷ Script for enscription

Lab Assignments

Enscryption program in C

~~#stdio.h~~

```
#include <stdio.h>
#include <string.h>

int main ()
{
    char Str[100];
    int i,j;
    printf("enter a string \n");
    scanf("%s", str); printf("enter a password for encryption
                                and decryption \n");
scanf("%d",&j); for (i=0; i<100 && Str[i]≠'/0'; i++)
        { Str[i] = Str[i]+1 ; }
        printf("enscypted String is: %s ", Str);

    char choose;
    int pass;
    printf("if you want to decrypt the String [Y/n]\n");
      scanf("%c", &choose);
      if (choose =='y' && choose =='Y') {
          { printf("enter the password \n");
            if (Pass scanf(
```

2/09/2024

Character

ASCII → 8 bit

Java T program.com

* characters set → Source character set

→ UTF-8

Unicoard text format-8

isalpha

ispunct

isdigit

isspace

iscntrl

gcc main.c -f input-charset = UTF-8

65-90 → uppercase letter.

97-122 → lowercase

0-31, 127 → control character

UTF-8 → Universal Transformation Format-8

Operators in C

- Unary operator → ++, --
- Binary " → =, +=, -=, *=, /=, % = (assignment operator)
  +, -, *, /, % (arthmetic)
  <, <=, >, >=, ==, != (Relational)
  &&, ||, ! (logical)
  &, |, <<, >> ... (operator)
- Ternary "

a+b ⇒ This expression which call infix operation

ab+ → +ab

postfix and prifix

a+b*c

a+bc*

abc*+

a+b-c → ab+c-

1
1015
10
3

infix → postfix

polish notation

Ternary operator → ? : condi

03/09/2024

memory manager

pointer variable only can hold address of a variable

int *d;

a = 8

c = (a++) + 1

10

10

$a = 3$

$b = 4$

$c = (a++) + (b++)$

$= 3 + 4$

$= 7$

$= 4 + 5$

$= 9$

23/09/2024

Selection constructs.

Select among a given option.

1) if statement.

- if, else statement

if, elseif statement

elseif ladder

- if with brace
- if with out brace
- if with else
- if without else

ternary operator

Short and if

$(a > b)$ ? True condition ; False condition ;

This is also a selection construction

Ternary operation

Short and if

2) Switchcase

XNOR

1011
1011
1111

1110
1011
1010