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1022

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1 Explain translators in deteil.

→ A translator is a programing language processor that converts a computer program form one language to another.

→ It takes a program written in source code and converts in into machine code. It discovers and identifiers the error ~~during~~ during translation.

→ It translate high-languges program into a machine language that the central progessing unit (CPU) can understand. It also detects errors in the program.

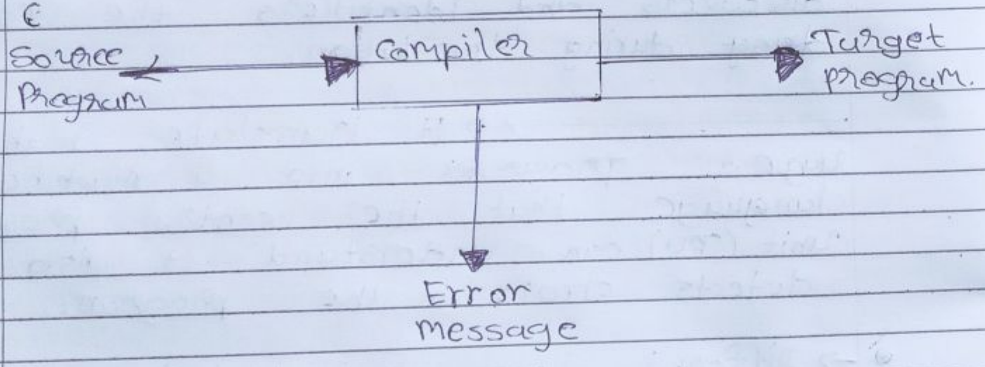
- → Differnt Type of Translators :-

→ There are different type of translators as follows :-

1. Compiler :-

→ A compilar is a translator used to convert high-level programming language to low-level programming language.

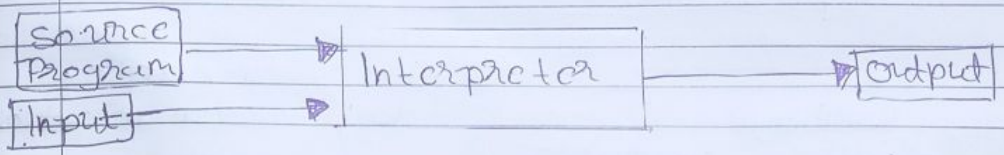
→ It converts the program one at a time and reports errors detected at once while doing to conversion.



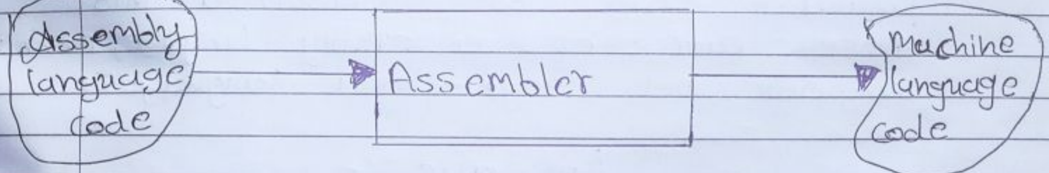
2. Interpreter

→ Just like a compiler is a tranlated used to convert-

high-level programming language. It converts the program ~~language~~ one at a time and report errors detected at once, while doing the conversion. with this, it is easier to detect errors than in a compiler.



3. Assembler :-



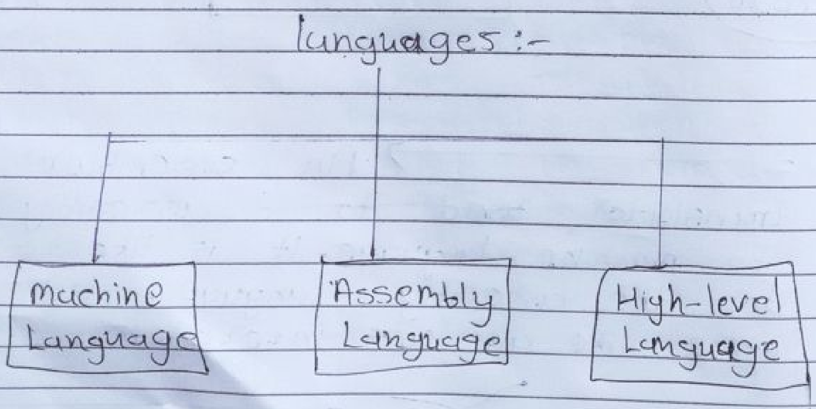
→ An assembler is a translator ~~used to~~ assembly languge to machine language. It is like a compilar for the assembly languge but interactive like an ~~ass~~ interpreter.

2 write a note on: types of languages:-

→ The computer language is defined as code or syntax which is used to write programs or any specific applications.

→ The computer language is used to communication with computers.

→ Broadly the computer language can be classified into three categories assembly languge, machine language, and high-level languages.



1. Machine Languegge:-

→ The machine language is sometimes referred as mchine code or object code which is set of binary digits 0 and 1

→ These binary digits are understood and read by a computer system and interpret it easily.

→ It is considred a native language as it can be directly understood by a central processing unit (CPU).

→ The compiler is used to convert the programs to machine languge which can by easily understood by computer systems. The compiler generates the binary file and executable file.

2. Assembly Language

→ The assembly languges is also considered as second generation languge:

→ The assembly language is considered a low-level language for micoprocessors and many other programmble devices

→ The first generation language is machine language. The assembly language is mostly famous for written an operating system and also in writing different desktop applications.

3. High-language:

→ The development of high-level language was done when programmers face the issue in writing programs as the older languges has portability issues which mean the code written in one machine cannot be transferred to other machines.

3 Explain ~~a note on it~~ types of Operating Systems.

→ An operating system performs all the basic tasks like managing file, process and memory.

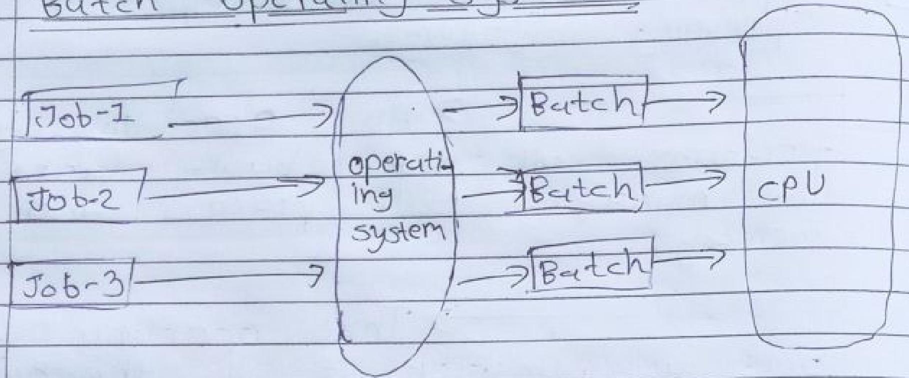
→ Thus operting system acts as manager of all the resources i.e resource manager.

→ Thus operating system becomes an interface between user and machine.

→ Some of the widely used operating systems are as follows:-

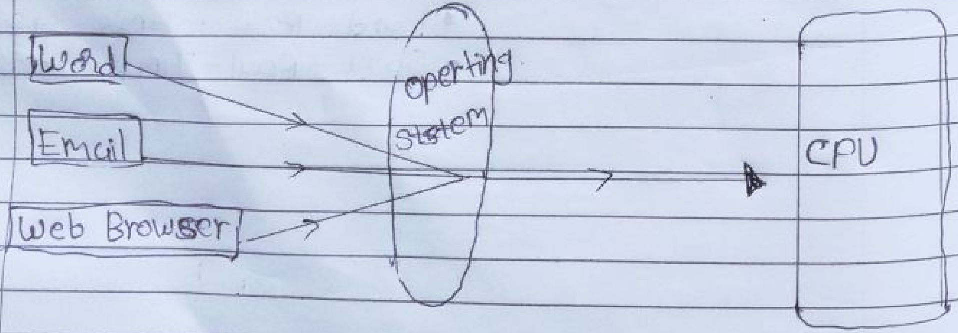
(1) Batch operating system
(2) Time - sharing operating system
(3) Real - Time operating system
- Hard - Real - Time system
- Soft - Real - Time system

1. Batch operating system:-



→ This type of operating system does not interact with the computer ~~disp~~ directly. There is an operator which takes similar Jobs having same requirement and group them into batches. It is the responsibility of operator to sort the jobs with similar needs.

2. Time-Sharing operating systems:-



→ Each task is given some time to execute so that all the tasks work smoothly.

→ Each user gets time of CPU as they use single system. These systems are also know as multitasking Systems.

3. Real-Time operating system:-

→ These types of OSs serrers the real-time systems. The time interval required to process and respond to inputs is very small. This time interval is called respone time

-two types:-

1. Hard Real-Time systems:-

→ These OSs are meant for the applications where time constraints are very strict and even the shortest possible delay is not acceptable.

2. Soft-Real-Time Systems:-

→ These OSs are for applications where for time-constraint is less strict.

4 Write a note on: ASCII code:-

→ ASCII stands for American standard code for Information Interchange.

→ It code for representing 128 English characters as numbers, with each letter assigned a number from 0 to 127. For example, the ASCII code for uppercase M is 77.

→ most computer use ASCII codes to represent text, which makes it possible to transfer data form one computer to another.

→ ASCII is a character encoding standard for eletronic communication.

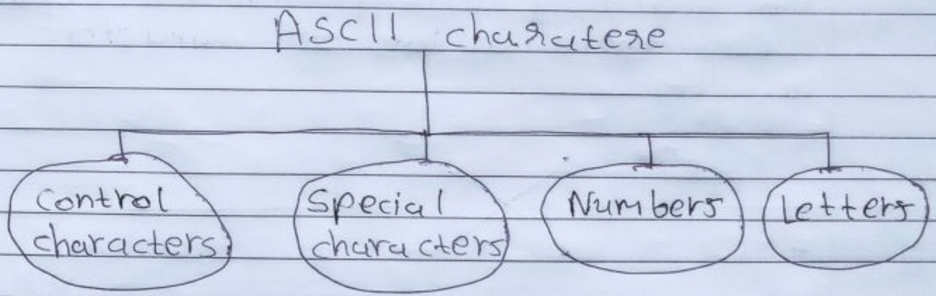
→ ASCII code for a to z is form 97 to 122.

→ That means, 97 for a, 98 for b, 99 for c, z for 122

→ ASCII code for A to z is from 65 to 90.

→ That means, 65 for A, 66 for B and 90 for Z.

→ ASCII codes are also availble for special characters like space, enter key, shift, etc....



→ The ASCII scripts are not finest collections of enocodings charters sets are replaciping it.

→ Only software based on UNIX and DOS use ASCII whereast the windows OS uses a different Unicode.

→ It can collect characters form various language.

→ It can collects characters form language with characters larger than 250 in figures.

→ Unicode utilizes an incredibly huge portion of expanse since there a lot of characters in it

5 Convert the followings :-

(1) $(1563.554)_8 = (?)_{16}$

Octal	No	Hexa-D
000	0	0000
001	1	0001
010	2	0010
011	3	0011
100	4	0100
101	5	0101
110	6	0110
111	7	0111
	8	1000
	9	1001
	A	1010
	B	1011
	C	1100
	D	1101
	E	1110
	F	1111

1 - 001	5 - 101
5 - 101	5 - 101
6 - 110	4 - 100
3 - 011	

$= \underbrace{0011}_{3}\,\underbrace{0111}_{7}\,\underbrace{0011}_{3}\;.\;\underbrace{1011}_{B}\,\underbrace{0110}_{6}0$

$\Rightarrow \boxed{\therefore (1563.554)_8 = (373.B6)_{16}}$

(c) $(1101111000.01100011)_2 = (?)_{10}$

$$\begin{array}{cccccccccc} 9 & 8 & 7 & 6 & 5 & 4 & 3 & 2 & 1 & 0 \\ 1 & 1 & 0 & 1 & 1 & 1 & 1 & 0 & 0 & 0 \end{array}$$

$= (1 \times 2^{9}) + (1 \times 2^{8}) + (0 \times 2^{7}) + (1 \times 2^{6}) + (1 \times 2^{5})$
$(1 \times 2^{4}) + (1 \times 2^{3}) + (0 \times 2^{2}) + (0 \times 2^{1}) + (0 \times 2^{0})$

~~$= 256 + 128 + 0 + 32 + 16 + 8 + 0 + 0 + 0$~~

$= 512 + 256 + 64 + 32 + 16 + 8$

$= \boxed{(888)_{10}}$

~~$\begin{array}{cccccccc} -1 & -2 & -3 & -4 & -5 & -6 & -7 & -8 \\ 0 & 1 & 1 & 0 & 0 & 0 & 1 & 1 \end{array}$~~

~~$= (0 \times 2^{-1}) + (1 \times 2^{-2}) + (1 \times 2^{-3}) + (0 \times 2^{-4}) + (0 \times 2^{-5})$
$(0 \times 2^{-6}) + (1 \times 2^{-7}) + (1 \times 2^{-8})$~~

~~$= 0 + \frac{1}{2} + \frac{1}{8} + 0 + 0 + 0 + \frac{1}{128} + \frac{1}{256}$~~

~~$= 0.5 + 0.125 + 0.0078125 + 0.00390625$~~

~~$=$~~

~~$\begin{array}{ccccccc} -1 & -2 & -3 & -4 & -5 & -6 & -7 \\ 1 & 1 & 0 & 0 & 0 & 1 & 1 \end{array}$~~

~~$= (1 \times 2^{-1}) + (1 \times 2^{-2}) + (0 \times 2^{-3}) + (0 \times 2^{-4}) + (0 \times 2^{-5})$
$(1 \times 2^{-6}) + (1 \times 2^{-7})$~~

~~$= \frac{1}{2} + \frac{1}{4} + 0 + 0 + 0 + \frac{1}{64} + \frac{1}{128}$~~

~~$= 0.5 + 0.25 + 0.015625 + 0.078125$~~

$$\begin{array}{cccccccc} -1 & -2 & -3 & -4 & -5 & -6 & -7 & -8 \\ 0 & 1 & 1 & 0 & 0 & 0 & 1 & 1 \end{array}$$

$= \cancel{(0 \times 2^{-1})} + (1 \times 2^{-2}) + (1 \times 2^{-3}) + \cancel{(0 \times 2^{-4})} + \cancel{(0 \times 2^{-5})}$
$\cancel{(0 \times 2^{-6})} + (1 \times 2^{-7}) + (1 \times 2^{-8})$

$= \frac{1}{4} + \frac{1}{8} + \frac{1}{128} + \frac{1}{256}$

$= 0.25 + 0.125 + 0.0078125 + 0.0039625$

$= \boxed{(0.38671875)_{10}}$

$\therefore \boxed{(888.38671875)_{10}}$

(3) $(456.76)_{10} = (?)_8$

8	456	
8	57	0
8	7	1

```
       57          7
  8 | 456     8 | 57
      40          56
      056         01
       56
       00
```

$= \boxed{(710)_8}$

0.76 × 8 = 6.08	6
0.08 × 8 = 0.64	0
0.64 × 8 = 5.12	5
0.12 × 8 = 0.96	0
0.96 × 8 = 7.68	7
0.68 × 8 = 5.44	5
0.44 × 8 = 3.52	3

$= (.6050753)_8$

$\therefore \boxed{(710.6050753)_8}$

(4) $(A1D6)_{16} = (?)_8$

Hexa	No	Octal
0000	0	000 → 0
0001	1	001 → 1
0010	2	010 → 2
0011	3	011 → 3
0100	4	100 → 4
0101	5	101 → 5
0110	6	110 → 6
0111	7	111 → 7
1000	8	
1001	9	
1010	A	
1011	B	
1100	C	
1101	D	
1110	E	
1111	F	

A = 1010
1 = 0001
D = 1101
6 = 0110

$= \underbrace{001}_{1}\ \underbrace{010}_{2}\ \underbrace{000}_{0}\ \underbrace{111}_{7}\ \underbrace{010}_{2}\ \underbrace{110}_{6}$

$= \boxed{(120726)_8}$

(5) $(101110000111.11111)_2 = (?)_{16}$

Binary	Hexa
0000	0
0001	1
0010	2
0011	3
0100	4
0101	5
0110	6
0111	7
1000	8
1001	9
1010	A
1011	B
1100	C
1101	D
1110	E
1111	F

$$= \underbrace{1011}_{B}\ \underbrace{1000}_{8}\ \underbrace{0111}_{7}\ .\ \underbrace{1111}_{F}\ \underbrace{1000}_{8}$$

$$= \boxed{(B87.F8)_{16}}$$

6 Explain BCD code in deteil:-

→ Binary coded Decimal, or BCD is another process for converetting decimal number into their binary equivalents.

→ It is a form of binary encoding where each digit in a decimal number is represented in the form of bits.

→ This encoding can be done in either 4-bit or 8-bit (usually 4-bit is presferred).

→ It is a fust and efficient system that converts the decimal numbers into binary numbers as compared to the existing binary system.

→ These are generelly used in digital display where is the manipulation of data is quite a take,

→ Thus BCD plays an important role here because the manipulation is done treating each digit as a separete single sub-sircuit.

Condier the follwing trth table and focus on how are these represented.

Dicimal Number	BCD
0	0000
1	0001
2	0010
3	0011
4	0100
5	0101
6	0110
7	0111
8	1000
9	1001

Example:-

1. Convert $(123)_{10}$ in BCD

→

1 → 0001
2 → 0010
3 → 0011

Ans → 0001 0010 0011

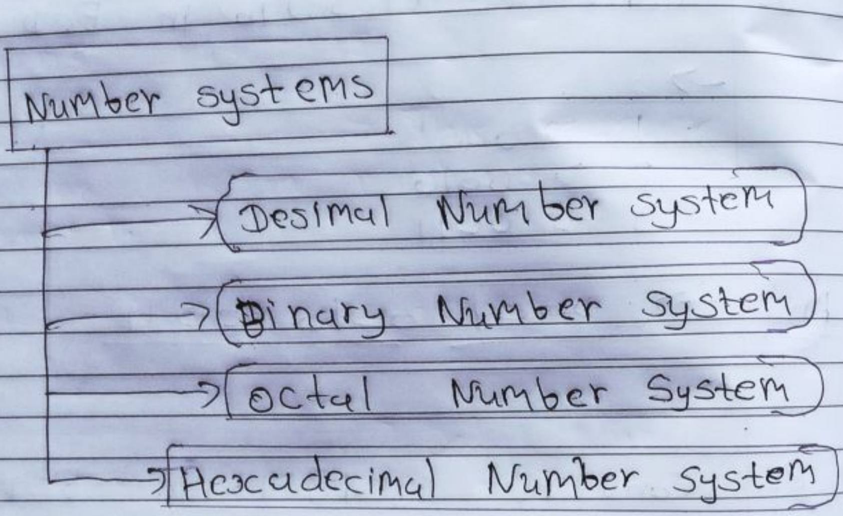
2. Convert $(324)_{10}$ in BCD

3 → 0011
2 → 0011
4 → 0100

Ans = 0011 0011 0100

7 List out all number systems and also write base for number systems:→

→



Number systems List out

(1) Desimal Number system
(2) Binary Number system
(3) Octal Number system
(4) Hexa decimal Number system.

→ Base systems like binary and hexadecimal seem a bit strange at first.

→ The Key is understanding how different systems "tick over" like an odometer when they are full.

→ Base 10, our decimal system, "ticks over" when in gets 10 items, creating a new digit.

1. Desimal Number system:-

→ Desimal number systems is Base is 10.

→ This number is 0,1,2,3,4,5,6,7,8,9.

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(2) Binary Number systems :-

→ Binary Number systems Base is 2.

→ This number systems is in numbers is only 0 and 1.

(3) Octal Number systems:-

→ Octal Number systems . Base is 8.

→ This number systems in number is 0,1,2,3,4,5 6,7,8,9.

(4) Hexa-decimal Number systems:-

→ Hexa decimal Number system Base is 16.

→ Number size is 0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F.