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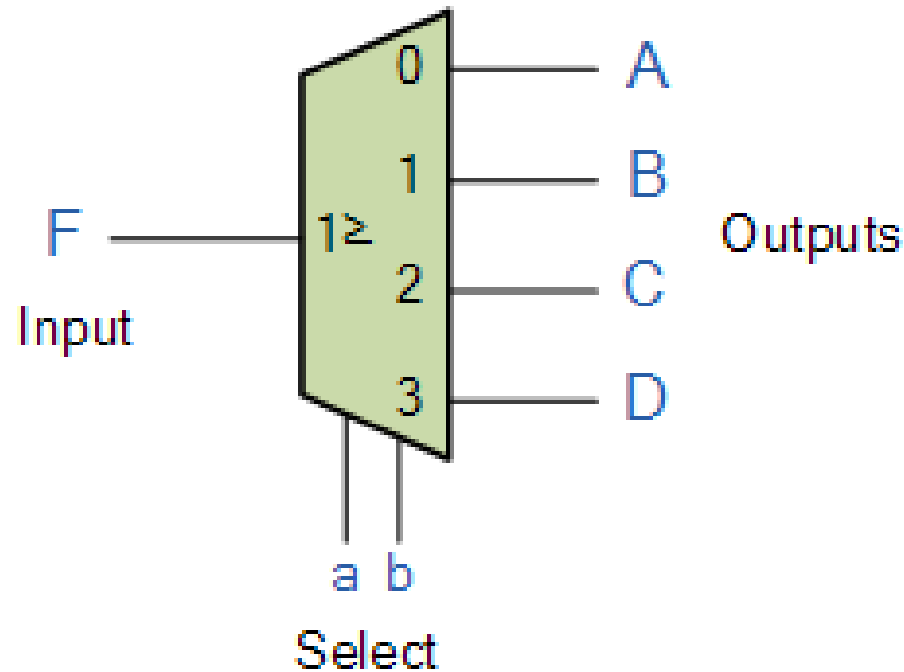
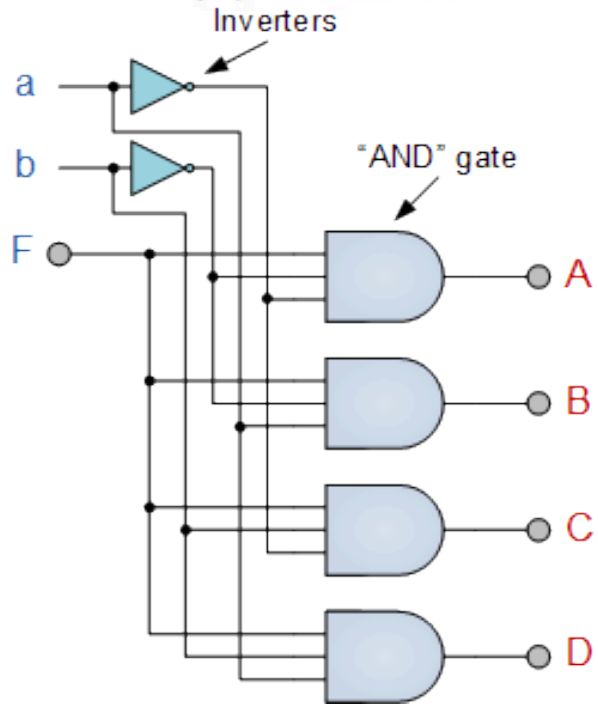
POST GRADUATE TEACHER

COMPUTER SCIENCE

- 26.** A combinational logic circuit that is used when it is desired to send data from two more source through a single transmission line is known as _____.
- (1) demultiplexer (2) encoder
(3) decoder (4) multiplexer

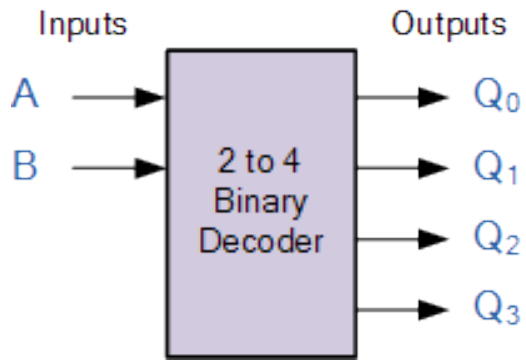
26. A combinational logic circuit that is used when it is desired to send data from two more source through a single transmission line is known as _____.

- (1) demultiplexer
- (2) encoder
- (3) decoder
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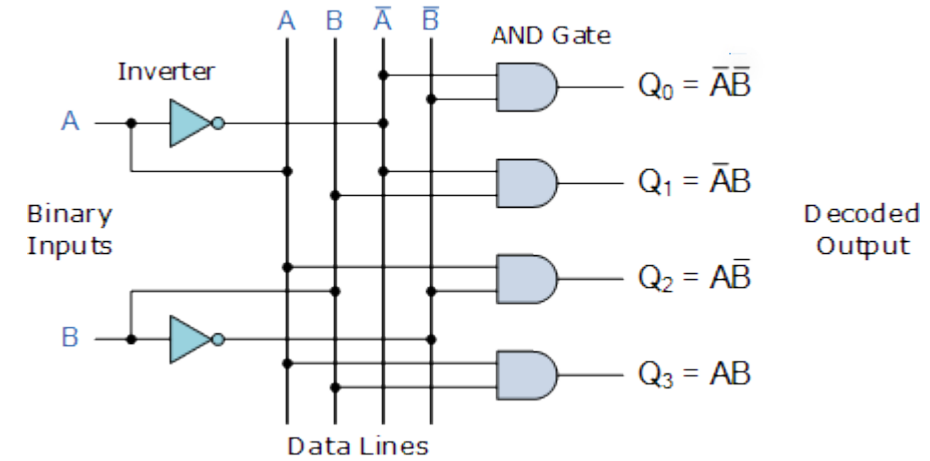
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- (1) demultiplexer
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- (3) decoder
- (4) multiplexer



Truth Table

A	B	Q ₀	Q ₁	Q ₂	Q ₃
0	0	1	0	0	0
0	1	0	1	0	0
1	0	0	0	1	0
1	1	0	0	0	1



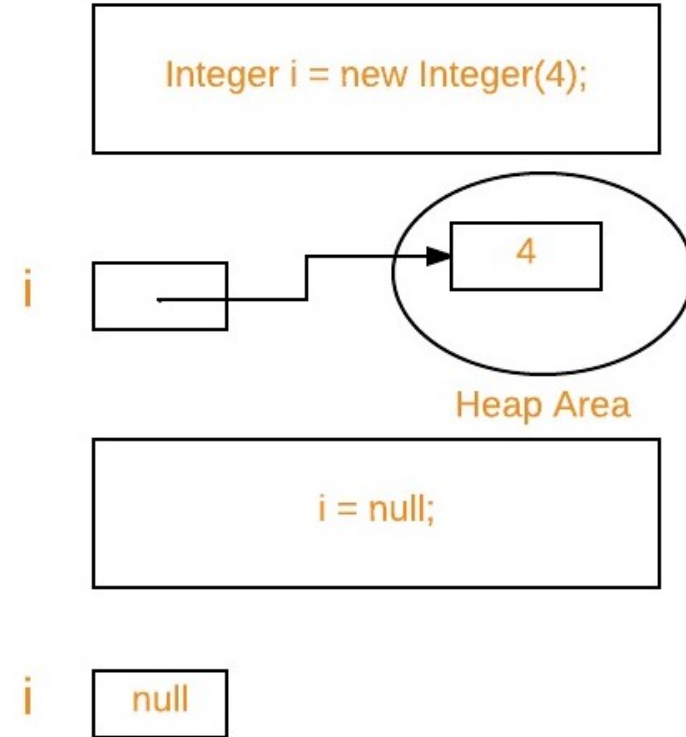
27. What is garbage collection in the context of Java?

- (1) The Java Virtual Machine (JVM) checks the output of any Java program and deletes anything that does not make sense at all.
- (2) The operating system periodically deletes all of the Java files available on the system.
- (3) Any Java package imported in a program and not being used, is automatically deleted.
- (4) When all references to an object are going, then the memory used by the object is automatically reclaimed.

- in C/C++, programmer is responsible for both creation and destruction of objects. Usually programmer neglects destruction of useless objects. Due to this negligence, at certain point, for creation of new objects, sufficient memory may not be available and entire program will terminate abnormally causing OutOfMemoryErrors.
- But in Java, the programmer need not to care for all those objects which are no longer in use. Garbage collector destroys these objects.
- Garbage collector is best example of Daemon thread as it is always running in background.
- Main objective of Garbage Collector is to free heap memory by destroying unreachable objects.

- Unreachable objects : An object is said to be unreachable iff it doesn't contain any reference to it. Also note that objects which are part of island of isolation are also unreachable.
- **Eligibility for garbage collection** : An object is said to be eligible for GC(garbage collection) iff it is unreachable. In above image, after `i = null`; integer object 4 in heap area is eligible for garbage collection.

```
Integer i = new Integer(4);
// the new Integer object is reachable via the reference in 'i'
i = null;
// the Integer object is no longer reachable.
```



Ways to make an object eligible for GC

Even though programmer is not responsible to destroy useless objects but it is highly recommended to make an object unreachable (thus eligible for GC) if it is no longer required.

There are generally four different ways to make an object eligible for garbage collection.

- ✓ Nullifying the reference variable
- ✓ Re-assigning the reference variable
- ✓ Object created inside method
- ✓ Island of Isolation

■ Island of Isolation:

- *Object 1 references Object 2 and Object 2 references Object 1. Neither Object 1 nor Object 2 is referenced by any other object. That's an island of isolation.*
- *Basically, an island of isolation is a group of objects that reference each other but they are not referenced by any active object in the application. Strictly speaking, even a single unreferenced object is an island of isolation too.*

28. What is the full form of DTD that is used to describe content in an XHTML document?

- (1) Document To Definition
- (2) Document Type Definition
- (3) Document Towards Definition
- (4) Document Text Definition

XML DTD

- An XML document may have an *optional* DTD, which defines the document's grammar.

Since the DTD defines the XML document's grammar, we can use an XML parser to check that if an XML document conforms to the grammar defined by the DTD.

- The purpose of a DTD is to define the legal building blocks of an XML document.
- Terminology for XML:
 - well-formed: if tags are correctly closed.
 - valid: if it has a DTD and conforms to it.

Validation is useful in data exchange.



- 29.** A register in the microprocessor that keeps track of the answer or result of any arithmetic or logic operation is the _____.
- (1) accumulator
 - (2) stack pointer
 - (3) program counter
 - (4) instruction pointer

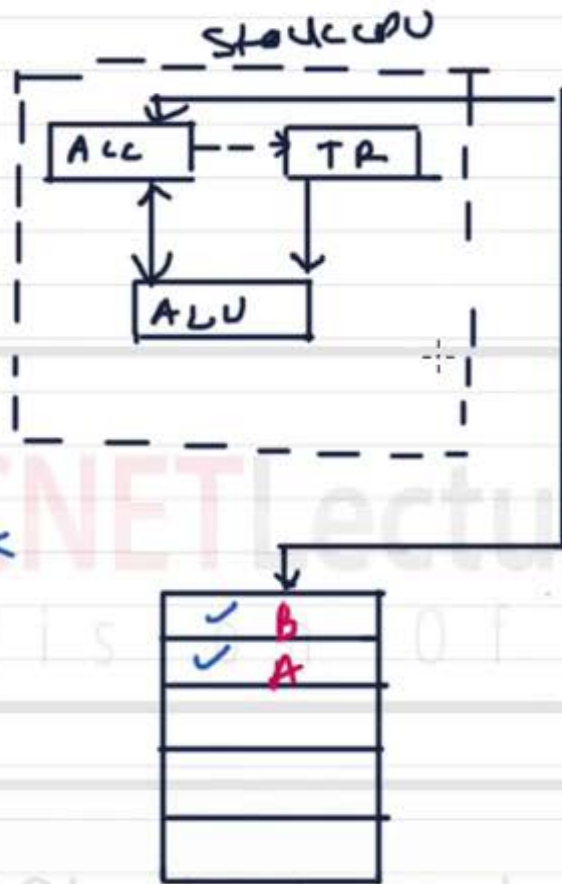
Stack CPU Organisation

ADD

① ALU operations are always performed on a stack data.

i.e both the operands are always present in the stack.

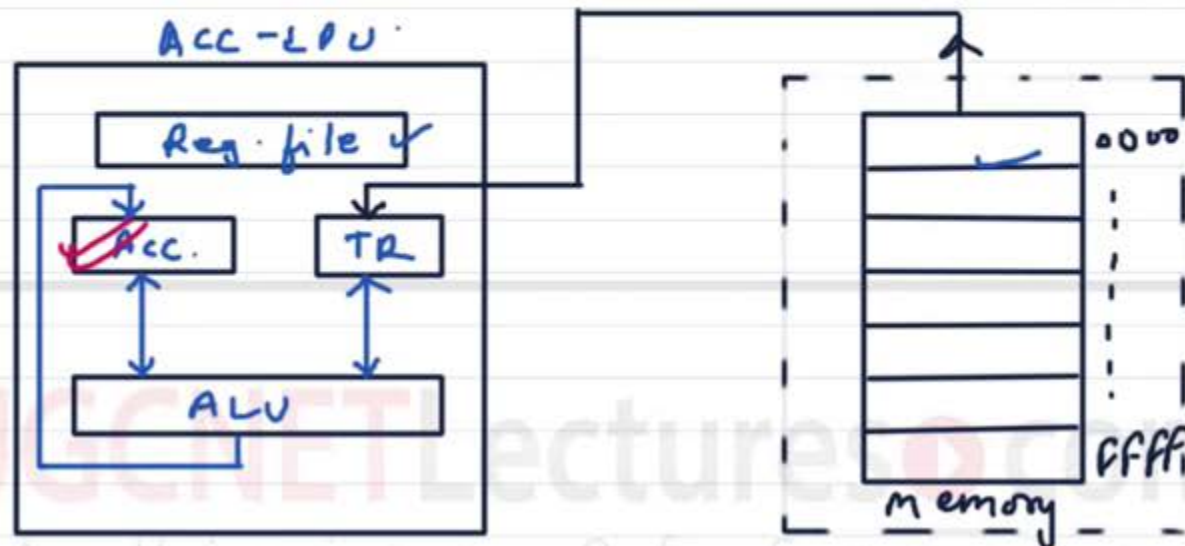
After the operation, the manipulation result is also placed into the stack



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Accumulator CPU Organisation.



- ① In this org. the 1st ALU operand is always present in the Accumulator & the 2nd operand is present either in Reg. file or in memory.
- ② After the data manipulation the result is placed into the Acc.
- ③ Acc is default location
- ④ 1 Address instr.

30. If the time quantum size is 2 units of an there is only one job of 14 time unit in a ready queue, the round-robin scheduling algorithm will cause _____ connected switches.

- (1) 1
- (3) 6

- (2) 5
- (4) 7

31. The memory which does not lose its content on failure of power supply is known as ____ memory.
- (1) main memory
(2) volatile
(3) non-volatile
(4) RAM
32. The content of _____

- Volatile memory is computer storage that only maintains its data while the device is powered.
- Most RAM (random access memory) used for primary storage in personal computers is volatile memory. RAM is much faster to read from and write to than the other kinds of storage in a computer, such as the hard disk or removable media. However, the data in RAM stays there only while the computer is running; when the computer is shut off, RAM loses its data.
- Volatile memory contrasts with non-volatile memory, which does not lose content when power is lost. Non-volatile memory has a continuous source of power and does not need to have its memory content periodically refreshed.



31. The memory which does not lose its content on failure of power supply is known as ____ memory.
- (1) main memory
(2) volatile
(3) non-volatile
(4) RAM
32. The content of _____

(4) RAM

32. The easiest method in flash to draw a heptagon, is to use the _____.

- (1) Polystar Tool with the "Polygon" style
- (2) Polygon Tool
- (3) Lasso Tool with the "create star" option
- (4) Polystar Tool with the "star" style

- (4) RAM
- 32.** The easiest method in flash to draw a heptagon, is to use the _____.
- (1) Polystar Tool with the "Polygon" style
 - (2) Polygon Tool
 - (3) Lasso Tool with the "create star" option
 - (4) Polystar Tool with the "star" style

These three tools for drawing geometric shapes: **Rectangle** (*Rectangle Tool (R)*), **Oval** (*Oval Tool (O)*) and **Polygon** (*PolyStar Tool*) are on the **Tools Panel**, all in the "Rectangle" button

Polygon - Star (PolyStar)

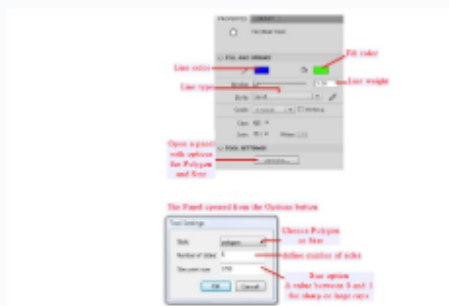
Polystar tool allows you to easily create complex vector shapes.

You can use this tool to create polygons and stars. Both styles have characteristics that can be defined in the "Properties panel" before you draw the shape.

Both the polygon and star style can have up to 32 sides.

Experiment with several options to get the kind of shape you want.

PolyStar options



- Click and hold the "Rectangle tool" on the Tools panel, and then point to **PolyStar Tool**.
- Click **Options** in the "Properties panel".
- Click the **Style** list arrow, and then select **Polygon** or **Star**.
- Enter a value for the number of sides (from 3 to 32).
- For the Star style, you can specify an additional option for **Star point size**. You can enter a value ranging from 0.1 to 1.0 points.
- Click OK, drag on the Stage, and then release the mouse.

See the example in the image below.



33. If the period of a signal is 1000 ms, then what is its frequency in kilohertz?

- (1) 10^{-1} KHz (2) 1 KHz (3) 10^{-3} KHz (4) 10^{-2} KHz

33. If the period of a signal is 1000 ms, then what is its frequency in kilohertz?

(1) 10^{-1} KHz (2) 1 KHz (3) 10^{-3} KHz (4) 10^{-2} KHz

- Frequency is the number of occurrences of a repeating event per unit of time.
- It is also referred to as temporal frequency, which emphasizes the contrast to spatial frequency and angular frequency.
- The period is the duration of time of one cycle in a repeating event, so the period is the reciprocal of the frequency

34. Which of the following Visual Basic statements will assign the value "QUICK" from the variable y to the string variable x?

y = "THE QUICK RED FOX JUMPED OVER THE DOG"

(1) `x = middle (y, 5, 5)`

(2) `x = Left (y, 5)`

(3) `x = mid (y, 5, 5)`

(4) `x = Instr (5, y, "QUICK")`

Strings.Mid Method

Namespace: [Microsoft.VisualBasic](#)

Assembly: [Microsoft.VisualBasic.dll](#)

Returns a string that contains characters from a specified string.

Overloads [↗](#)

[Mid\(String, Int32\)](#)

Returns a string that contains all the characters starting from a specified position in a string.

[Mid\(String, Int32, Int32\)](#)

Returns a string that contains a specified number of characters starting from a specified position in a string.


Strings.Left(String, Int32) Method

Namespace: [Microsoft.VisualBasic](#)

Assembly: Microsoft.VisualBasic.dll

Returns a string containing a specified number of characters from the left side of a string.

C#

 Copy

```
public static string Left (string str, int Length);
```

Parameters

str [String](#)

Required. [String](#) expression from which the leftmost characters are returned.

Length [Int32](#)

Required. [Integer](#) expression. Numeric expression indicating how many characters to return. If 0, a zero-length string ("") is returned. If greater than or equal to the number of characters in [str](#), the entire string is returned.

Returns

[String](#)

Returns a string containing a specified number of characters from the left side of a string.

Strings.InStr Method

Namespace: [Microsoft.VisualBasic](#)

Assembly: [Microsoft.VisualBasic.dll](#)

Returns an integer specifying the start position of the first occurrence of one string within another. The integer is a one-based index if a match is found. If no match is found, the function returns zero.

Overloads

[InStr\(Int32, String, String, Compare Method\)](#)

Returns an integer specifying the start position of the first occurrence of one string within another.

[InStr\(String, String, CompareMethod\)](#)

Returns an integer specifying the start position of the first occurrence of one string within another.

35. In structured programming, a program is de-composed into modules. Coupling and cohesion describe the characteristics of modules. A good decomposition should attempt to

- (1) Minimize coupling and minimize cohesion
- (2) Maximize coupling and minimize cohesion
- (3) Minimize coupling and maximize cohesion
- (4) Maximize coupling and maximize cohesion

Cohesion vs Coupling

Cohesion	Coupling
Cohesion is the indication of the relationship within module .	Coupling is the indication of the relationships between modules.
Cohesion shows the module's relative functional strength.	Coupling shows the relative independence among the modules.
Cohesion is a degree (quality) to which a component / module focuses on the single thing	Coupling is a degree to which a component / module is connected to the other modules.

Cohesion refers to what the class (or module) can do. Low cohesion would mean that the class does a great variety of actions - it is broad, unfocused on what it should do. High cohesion means that the class is focused on what it should be doing, i.e. only methods relating to the intention of the class.

Example of Low Cohesion:

```
-----  
| Staff |  
-----  
| checkEmail() |  
| sendEmail() |  
| emailValidate() |  
| PrintLetter() |  
-----
```

Example of High Cohesion:

```
-----  
| Staff |  
-----  
| -salary |  
| -emailAddr |  
-----  
| setSalary(newSalary) |  
| getSalary() |  
| setEmailAddr(newEmail) |  
| getEmailAddr() |  
-----
```

As for **coupling**, it refers to how related or dependent two classes/modules are toward each other. For low coupled classes, changing something major in one class should not affect the other. High coupling would make it difficult to change and maintain your code; since classes are closely knit together, making a change could require an entire system revamp.

Good software design has **high cohesion** and **low coupling**.

35. In structured programming, a program is de-composed into modules. Coupling and cohesion describe the characteristics of modules. A good decomposition should attempt to

- (1) Minimize coupling and minimize cohesion
- (2) Maximize coupling and minimize cohesion
- (3) Minimize coupling and maximize cohesion
- (4) Maximize coupling and maximize cohesion

36. Consider the database table “Persons” having Person_ID as the primary key.

Person_ID	Name	Age
1000	Rajan	10
–	Jatin	-45
1001	Rajesh	35

What are the constraints violated by the above table?

- (1) Relationship integrity
- (2) Referential integrity only
- (3) Entity and domain integrities
- (4) Referential and domain integrities

Referential Integrity

artist_id	artist_name
1	Bono
2	Cher
3	Nuno Bettencourt

Link Broken

artist_id	album_id	album_name
3	1	Schizophonic
4	2	Eat the rich
3	3	Crave (single)

Data Integrity

Data Integrity validates the data before getting stored in the columns of the table.
SQL Server supports four type of data integrity:

Entity Integrity

Entity Integrity can be enforced through indexes, UNIQUE constraints and PRIMARY KEY constraints.

Domain Integrity

Domain integrity validates data for a column of the table.

It can be enforced using:

Foreign key constraints,
Check constraints,
Default definitions
NOT NULL.

Referential Integrity

FOREIGN KEY and CHECK constraints are used to enforce Referential Integrity.

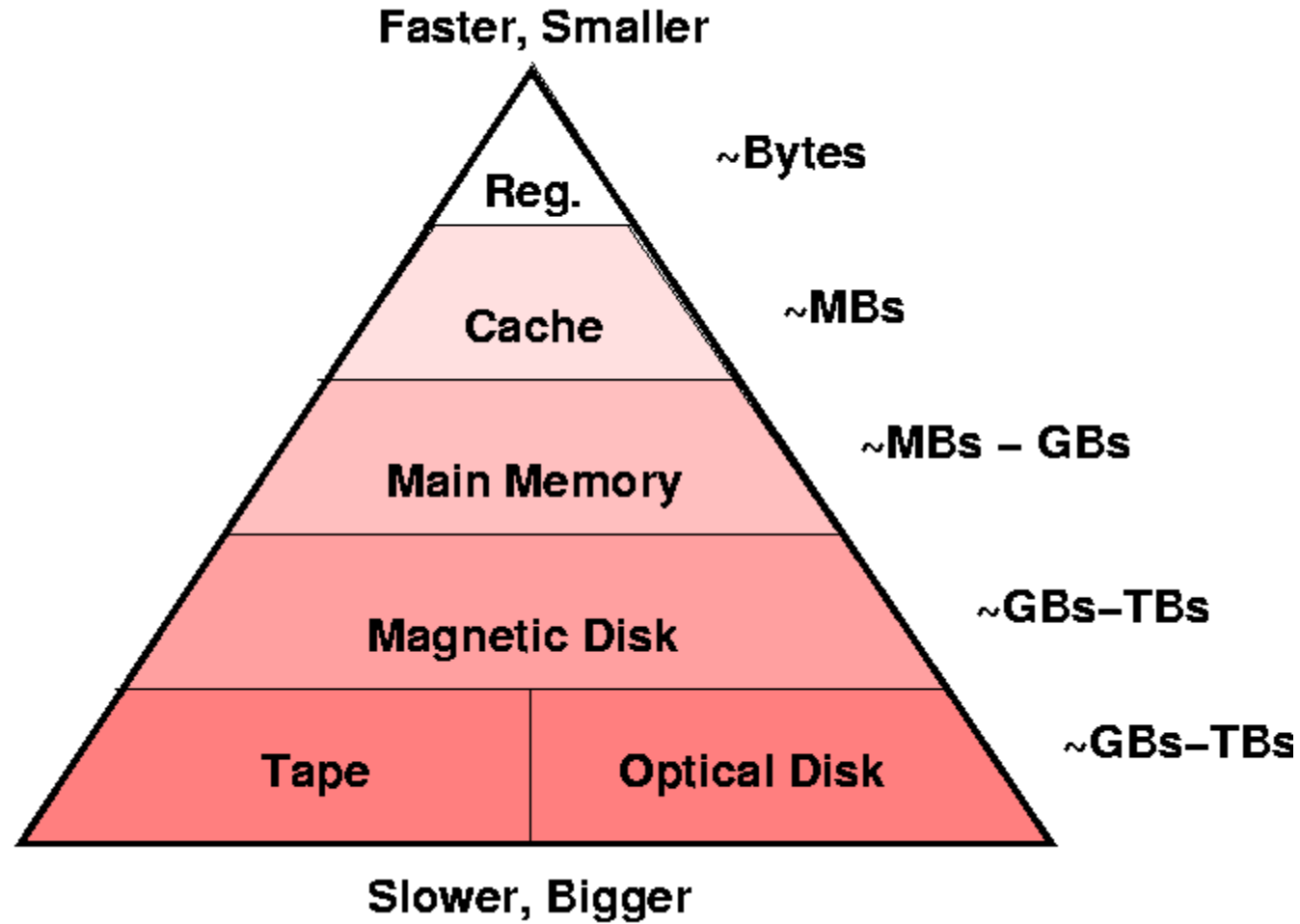
User-Defined Integrity

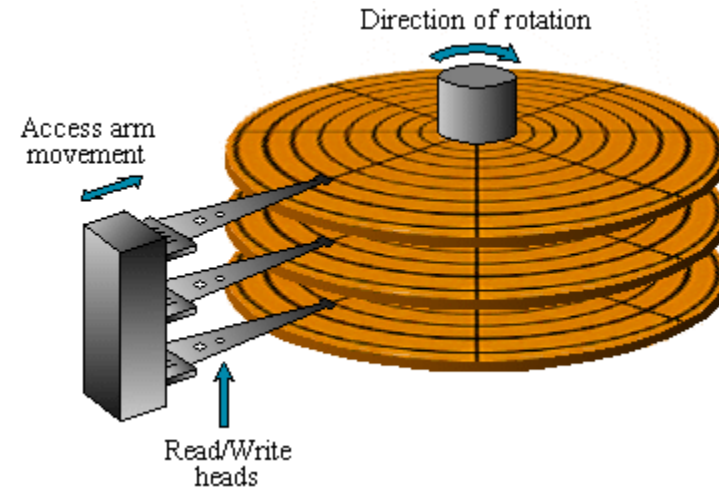
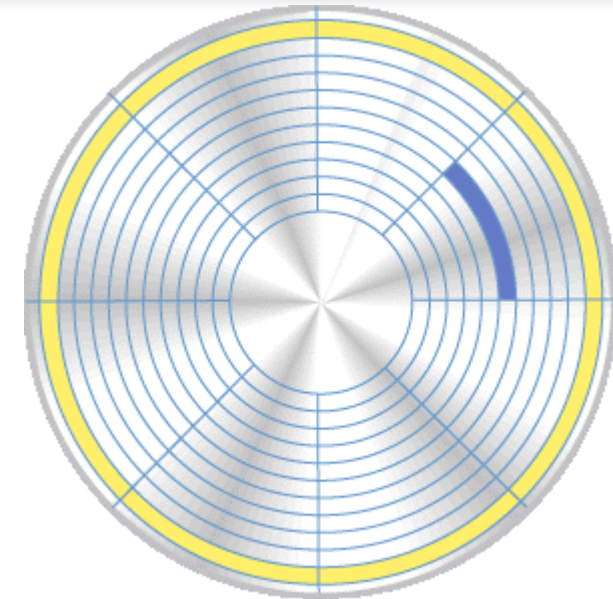
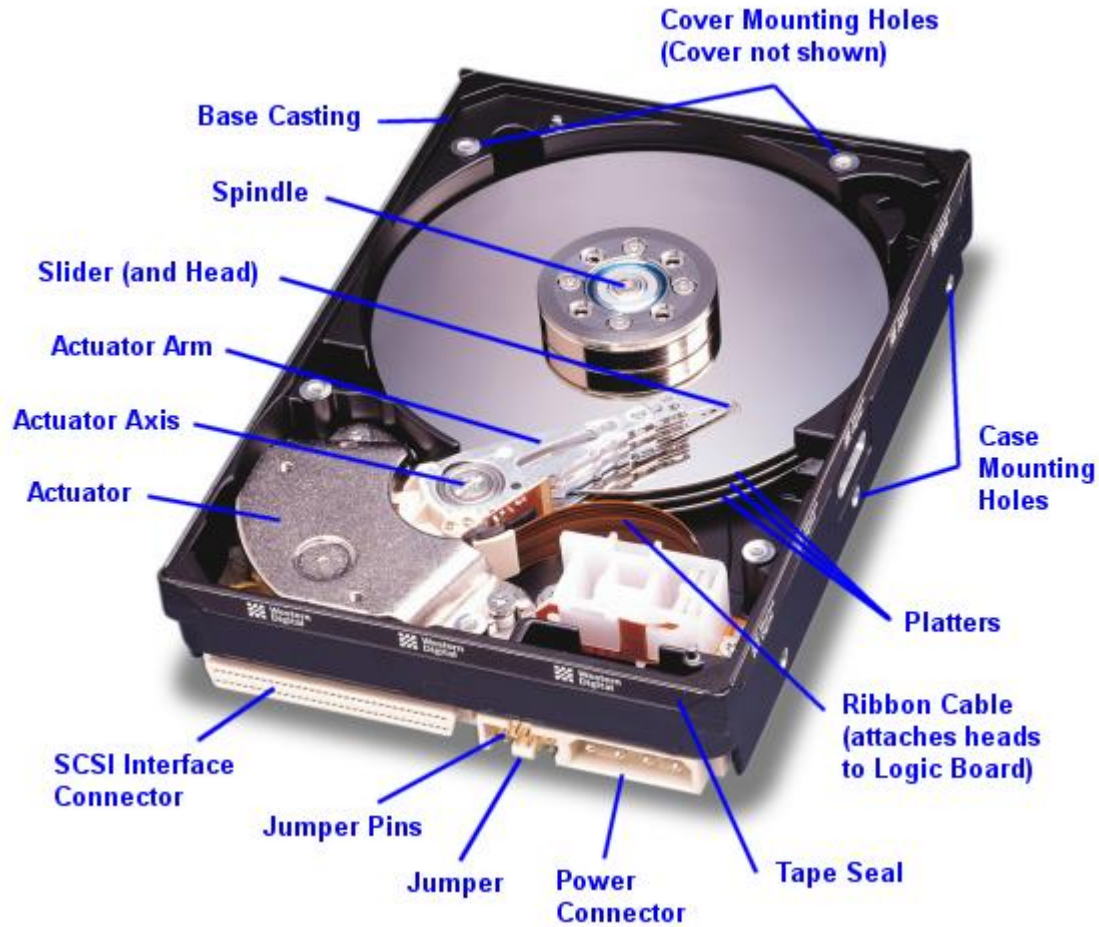
It enables you to create business logic which is not possible to develop using system constraints. You can use stored procedure, trigger and functions to create user-defined integrity.

37. On which of the following storage media, storage of information is organised as a single continuous spiral groove?

- (1) CD-ROM
- (3) Hard disk

- (2) RAM
- (4) Floppy disk







Writing

- laser burns 0.8 micron holes in a glass disk
- use this "master" to create a mold
- polycarbonate resin injected into molds
- coat with aluminum and protective laquer
- result is a disc with small "pits" and "lands"

Reading

- read head with a laser can then read differences in height to distinguish 0's and 1's (using destructive interference)
- actually use the transitions from lands to pit to hold information, since this is more reliable than trying to tell absolute depths.
- data stored as a single continuous spiral groove
- for audio, data must stream at uniform rate, so disk must slow down as it goes from inside to outside.



- Floppy disk drives were originally introduced commercially as a read-only device to hold microcode and diagnostics for large IBM mainframe computer systems in the early 1970s.
- Used to be the way software was distributed:
 - no DVDs
 - no CDs
 - no ZIP drives
 - no Internet
- Layout similar to hard drives, but:
 - Plastic film (floppy) disk rather than rigid aluminum platter
 - R/W head touches surface
 - slower
 - less durable
 - extra "spin up" times

38. The kernel keeps track of the state of each executing program by using a data structure called _____.

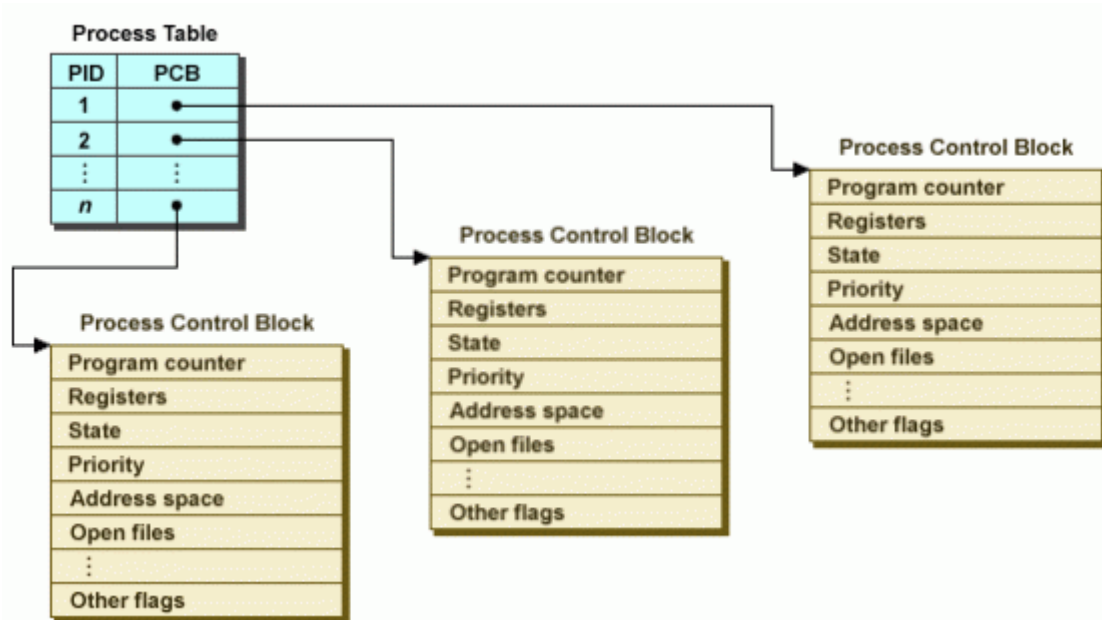
(1) process control block

(2) user control block

(3) file control block

(4) memory control block

Process Control Block (PCB, also called Task Controlling Block, Entry of the Process Table, Task Struct, or Switchframe) is a data structure in the operating system kernel containing the information needed to manage the scheduling of a particular process. The PCB is "the manifestation of a process in an operating system.



FCB (File Control Block) is an internal file system structure used in DOS for accessing files on disk. The FCB block contains information about the drive name, filename, file type and other information that is required by the system when a file is accessed or created.

file permissions
file dates (create, access, write)
file owner, group, ACL
file size
file data blocks or pointers to file data blocks

39. Recursive procedure is implemented using

- (1) string
- (2) queue
- (3) stack
- (4) linked list

40. For a tree with just one node, the root node is the height of a binary tree is defined to zero, if there are 2 levels of nodes, the height is 1 and so on.

A Binary Search Tree is built according to the usual rules with the following six key inserted one at a time as given

B, I, N, A, R, Y. What is the height of the tree?

(1) 5

(2) 2

(3) 3

(4) 4

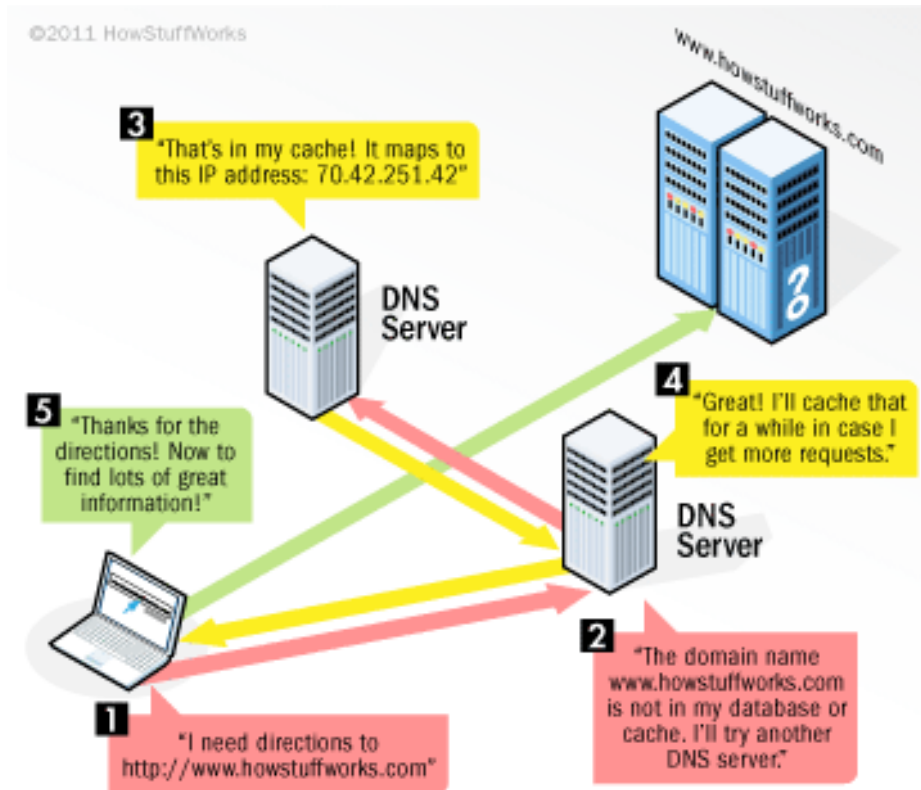
41. Which of the following sorting algorithms uses recursion?

- (1) Insertion sort
- (3) Merge sort

- (2) Heap sort
- (4) Bubble sort

- 42.** Mechanism that is used to convert domain name into IP address is known ____.
- (1) HTTP (2) URL (3) FTP (4) DNS

- 42.** Mechanism that is used to convert domain name into IP address is known ____.
- (1) HTTP (2) URL (3) FTP (4) DNS



43. The unit receiving the data item response with another control signal to acknowledgement receipt of the data. This type of agreement between two independent units is known as.

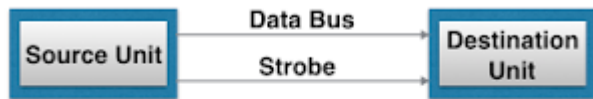
- | | |
|--------------------|------------------|
| (1) strobe control | (2) multitasking |
| (3) handshaking | (4) piggybacking |

Strobe Control:

The Strobe Control method of asynchronous data transfer employs a single control line to time each transfer. This control line is also known as strobe and it may be achieved either by source or destination, depending on which initiate transfer.

Source initiated strobe for data transfer:

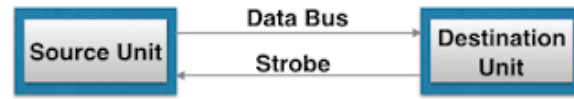
The block diagram and timing diagram of strobe initiated by source unit is shown in figure below:



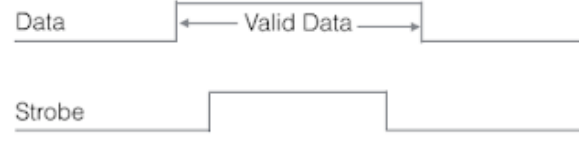
a) Block Diagram



b) Timing Diagram

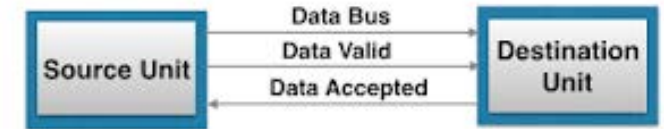


a) Block Diagram

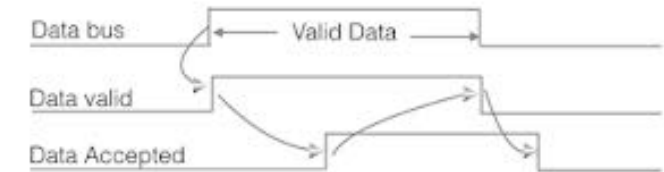


b) Timing Diagram

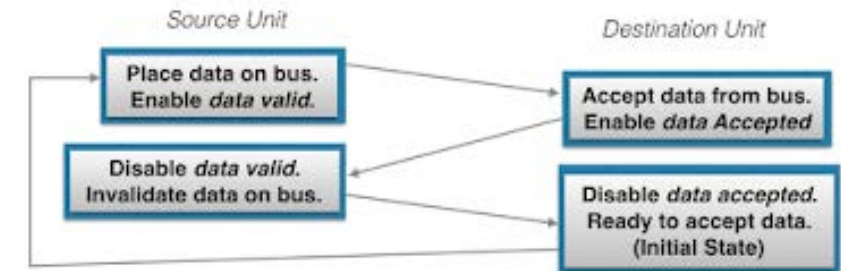
- Hand shaking method introduce a second control signal line that provides a replay to the unit that initiates the transfer.
- In it, one control line is in the same direction as the data flow in the bus from the source to destination. It is used by source unit to inform the destination unit whether there are valid data in the bus.
- The other control line is in the other direction from destination to the source. It is used by the destination unit to inform the source whether it can accept data.
- And in it also, sequence of control depends on unit that initiate transfer. Means sequence of control depends whether transfer is initiated by source and destination.



a) Block Diagram



b) Timing Diagram



c) Sequence Diagram (Sequence of events)

44. What correction is required for following Java code snippet to compile?

```
int [ ] X = new int [10];  
for (int P = 0; P <= X.length ( ); P++)  
    X [P] = 5;
```

- (1) X [P] = 5 should be X (P) = 5
- (2) P <= X.length () should be P < X.length()
- (3) X.length () should be X.length
- (4) P++ should be P+1

length vs length() in Java

array.length : length is a final variable applicable for arrays. With the help of length variable, we can obtain the size of the array.

string.length() : length() method is a final variable which is applicable for string objects. length() method returns the number of characters presents in the string.

length vs length()

1. The length variable is applicable to array but not for string objects whereas the length() method is applicable for string objects but not for arrays.
2. Examples:

```
// length can be used for int[], double[], String[]  
// to know the length of the arrays.  
  
// length() can be used for String, StringBuilder, etc  
// String class related Objects to know the length of the String
```

3. To directly accesses a field member of array we can use **.length**; whereas **.length()** invokes a method to access a field member.

45. Which of the following is not a transaction management SQL command?

- (1) Rollback (2) Commit (3) Select (4) Savepoint

COMMIT command

COMMIT command is used to permanently save any transaction into the database.

When we use any DML command like **INSERT**, **UPDATE** or **DELETE**, the changes made by these commands are not permanent, until the current session is closed, the changes made by these commands can be rolled back.

To avoid that, we use the **COMMIT** command to mark the changes as permanent.

Following is commit command's syntax,

```
COMMIT;
```

ROLLBACK command

This command restores the database to last committed state. It is also used with **SAVEPOINT** command to jump to a savepoint in an ongoing transaction.

If we have used the **UPDATE** command to make some changes into the database, and realise that those changes were not required, then we can use the **ROLLBACK** command to rollback those changes, if they were not committed using the **COMMIT** command.

Following is rollback command's syntax,

```
ROLLBACK TO savepoint_name;
```

SAVEPOINT command

SAVEPOINT command is used to temporarily save a transaction so that you can rollback to that point whenever required.

Following is savepoint command's syntax,

```
SAVEPOINT savepoint_name;
```

In short, using this command we can **name** the different states of our data in any table and then rollback to that state using the **ROLLBACK** command whenever required.

46. Concurrency control in RDBMS is important for which of the following reasons?

- (1) To ensure data integrity when reads occur to the database in a multi-user environment
- (2) To ensure data integrity when updates occur to the database in a single user environment
- (3) To ensure data integrity when updates occur to the database in a multi-user environment
- (4) To ensure data integrity when reads occur to the database in a single user environment

47. An operating system contains 3 user processes each requiring 2 units of resource R. The minimum number of units of R such that no deadlock will ever occur is

(1) 5

(2) 2

(3) 3

(4) 4

- 48.** The number of bits required to represent decimal number 4096 in binary form is ____.
- (1) 16 (2) 10 (3) 12 (4) 13

49. Which of the following memory improves the speed of execution of a program?

(1) Virtual memory

(2) Primary memory

(3) Secondary memory

(4) Cache memory

50. Which of the following statements is false with respect to relational DBMS?

- (1) A disadvantage of highly normalised tables is that queries may require too many time consuming joins
- (2) Foreign key constraints are referential integrity constraints
- (3) A primary key uniquely identifies a row in a table
- (4) Nulls reduce space requirements in tables