Computer graphics

Q5 a)

In the 2D system, we use only two coordinates X and Y but in 3D, an extra coordinate Z is added. 3D graphics techniques and their application are fundamental to the entertainment, games, and computer-aided design industries. It is a continuing area of research in scientific visualization.

Furthermore, 3D graphics components are now a part of almost every personal computer and, although traditionally intended for graphics-intensive software such as games, they are increasingly being used by other applications.

Parallel Projection

Parallel projection discards z-coordinate and parallel lines from each vertex on the object are extended until they intersect the view plane. In parallel projection, we specify a direction of projection instead of center of projection.

In parallel projection, the distance from the center of projection to project plane is infinite. In this type of projection, we connect the projected vertices by line segments which correspond to connections on the original object.

Parallel projections are less realistic, but they are good for exact measurements. In this type of projections, parallel lines remain parallel and angles are not preserved. Various types of parallel projections are shown in the following hierarchy.

Orthographic Projection

In orthographic projection the direction of projection is normal to the projection of the plane. There are three types of orthographic projections −

Front Projection

Top Projection

Side Projection

**Oblique Projection**

In orthographic projection, the direction of projection is not normal to the projection of plane. In oblique projection, we can view the object better than orthographic projection.

There are two types of oblique projections − **Cavalier** and **Cabinet**. The Cavalier projection makes 45° angle with the projection plane. The projection of a line perpendicular to the view plane has the same length as the line itself in Cavalier projection. In a cavalier projection, the foreshortening factors for all three principal directions are equal.

The Cabinet projection makes 63.4° angle with the projection plane. In Cabinet projection, lines perpendicular to the viewing surface are projected at ½ their actual length.

**Isometric Projections**

Orthographic projections that show more than one side of an object are called**axonometric orthographic projections**. The most common axonometric projection is an **isometric projection** where the projection plane intersects each coordinate axis in the model coordinate system at an equal distance. In this projection parallelism of lines are preserved but angles are not preserved.

**Perspective Projection**

In perspective projection, the distance from the center of projection to project plane is finite and the size of the object varies inversely with distance which looks more realistic.

The distance and angles are not preserved and parallel lines do not remain parallel. Instead, they all converge at a single point called **center of projection** or **projection reference point**. There are 3 types of perspective projections which are shown in the following chart.

**One point** perspective projection is simple to draw.

**Two point** perspective projection gives better impression of depth.

**Three point** perspective projection is most difficult to draw.

**Translation**

In 3D translation, we transfer the Z coordinate along with the X and Y coordinates. The process for translation in 3D is similar to 2D translation. A translation moves an object into a different position on the screen.

Q6 a)

RGB colors

RGB colors are the most popular ones used in computing applications. A color is defined by the **amount** of **R**ed - **G**reen - **B**lue.

RGB is the way computer monitors work. E.g. to get a nice yellow you need 100% Red + 100% Green + 0% Blue. RGB is a so-called **additive** color mixing model.“Projection of [primary color](http://en.wikipedia.org/wiki/Primary_color) lights on a screen shows secondary colors where two overlap; the combination of all three of red, green, and blue in appropriate intensities makes white.” ([Wikipedia](http://en.wikipedia.org/wiki/RGB_color_model)). Now if you project each of these primary colors with different intensity, overlapping colors will change.

The HSV/HSB model

The HSV (Hue, Saturation, Value) model also known as HSB (Hue, Saturation, Brightness) defines a color in terms of three components. This model is for instance available in Flash CS3 in addition to the RGB model.

**H**ue, the color: Represented as a position in the 360 degrees of a color circle.

**S**aturation, the intensity or "purity" of the color: Ranges from 0-100%. 0 means no color, i.e., a shade of grey between black and white. 100 means intense color.

**V**alue or **B**rightness of the color: Ranges from 0-100%. 0 is always black. Depending on the saturation, 100 may be white **or** a more or less saturated color. This can be fairly confusing and therefore some people prefer the simple HSL model we introduce below.

The HSL/HSI model

The HSL (Hue-saturation-lightness) model, also known as HSI (hue-saturation-intensity) model is similar to the HSV model described above. It is available in [CSS](http://edutechwiki.unige.ch/en/CSS) 3 for example.

Q6 b) Find the normalization transformation that maps a window whose lower left corner is at (1,1) and upper right corner is at (3, 5) onto (a) a viewport that is the entire normalized device screen and (b) a viewport that has lower left corner at (0, 0) and upper right corner (1/2,1/2)

Answer From problem 1, we need to identify the appropriate parameters

(a) The window parameters are wxmin = 1, wymax = 1, and wymax = 5. The viewport parameters are vxmin = 0, vxmax= 1, vymin = 0, and vymax = 1. Then sx =1/2, sy = 1/4 , and

N= ½ 0 -(1/2)

 0 ¼ -(1/4)

 0 0 1

(b) The window parameters are the same as in (a). The viewport parameters are not vxmin = 0, vxmax = 1/2 , vymin = 0, vymax = 1/2 . The sx = 1/4 , sy= 1/8 , and

N= 1/4 0 -(1/4)

 0 1/8 -(1/8)

 0 0 1

Data structure

***Q4 B) For a circular linked list write algorithms to***

1. ***insert an element in the list***
2. ***Search for an element in the list***

Answer:

insert an element in the list algorithm

//insert link at the first location

void insertFirst(int key, int data) {

 //create a link

 struct node \*link = (struct node\*)

malloc(sizeof(struct node));

 link->key = key;

 link->data= data;

 if (isEmpty()) {

 head = link;

 head->next = head;

 }else {

 //point it to old first node

 link->next = head;

 //point first to new first node

 head = link;

 }

#include<stdio.h>

#include<stdlib.h>

typedef struct Node

{

 int data;

 struct Node \*next;

}node;

void insert(node \*pointer, int data)

{

 node \*start = pointer;

 /\* Iterate through the list till we encounter the last node.\*/

 while(pointer->next!=start)

 {

 pointer = pointer -> next;

 }

 /\* Allocate memory for the new node and put data in it.\*/

 pointer->next = (node \*)malloc(sizeof(node));

 pointer = pointer->next;

 pointer->data = data;

 pointer->next = start;

}

int find(node \*pointer, int key)

{

 node \*start = pointer;

 pointer = pointer -> next;

//First node is dummy node.

 /\* Iterate through the entire linked

list and search for the key. \*/

 while(pointer!=start)

 {

 if(pointer->data == key) //key is found.

 {

 return 1;

 }

 pointer = pointer -> next;//Search in the next node.

 }

 /\*Key is not found \*/

 return 0;

}

void delete(node \*pointer, int data)

{

 node \*start = pointer;

 /\* Go to the node for which the node next to

 it has to be deleted \*/

 while(pointer->next!=start &&

 (pointer->next)->data != data)

 {

 pointer = pointer -> next;

 }

 if(pointer->next==start)

 {

 printf("Element %d is not present in the list\n",data);

 return;

 }

 /\* Now pointer points to a node and

the node next to it has to be removed \*/

 node \*temp;

 temp = pointer -> next;

 /\*temp points to the node

which has to be removed\*/

 pointer->next = temp->next;

 /\*We removed the node which is next to

 the pointer (which is also temp) \*/

 free(temp);

 /\* Beacuse we deleted the node, we no longer

 require the memory used for it .

 free() will deallocate the memory.

 \*/

 return;

}

void print(node \*start,node \*pointer)

{

 if(pointer==start)

 {

 return;

 }

 printf("%d ",pointer->data);

 print(start,pointer->next);

}

int main()

{

 /\* start always points to the first

 node of the linked list.

 temp is used to point to the last

 node of the linked list.\*/

 node \*start,\*temp;

 start = (node \*)malloc(sizeof(node));

 temp = start;

 temp -> next = start;

 /\* Here in this code, we take the

 first node as a dummy node.

 The first node does not contain data, but it

 used because to avoid handling special cases

 in insert and delete functions.

 \*/

 printf("1. Insert\n");

 printf("2. Delete\n");

 printf("3. Print\n");

 printf("4. Find\n");

 while(1)

 {

 int query;

 scanf("%d",&query);

 if(query==1)

 {

 int data;

 scanf("%d",&data);

 insert(start,data);

 }

 else if(query==2)

 {

 int data;

 scanf("%d",&data);

 delete(start,data);

 }

 else if(query==3)

 {

 printf("The list is ");

 print(start,start->next);

 printf("\n");

 }

 else if(query==4)

 {

 int data;

 scanf("%d",&data);

 int status = find(start,data);

 if(status)

 {

 printf("Element Found\n");

 }

 else

 {

 printf("Element Not Found\n");

 }

 }

 }

}}

1. Search for an element in the list

***Q5 A) What is sorting? Sort the following elements using quick sort method 55, 12, 3, 90, 16, 12, 70, 19. Also give the algorithm and efficiency for the same.***

**Answer** Sorting refers to ordering data in an increasing or decreasing fashion according to some linear relationship among the data items

**Insertion sort:** In this method, sorting is done by inserting elements into an existing sorted list. Initially, the sorted list has only one element. Other elements are gradually added into the list in the proper position.

**Merge Sort:** In this method, the elements are divided into partitions until each partition has sorted elements. Then, these partitions are merged and the elements are properly positioned to get a fully sorted list.

**Quick Sort:** In this method, an element called pivot is identified and that element is fixed in its place by moving all the elements less than that to its left and all the elements greater than that to its right.

**Radix Sort:** In this method, sorting is done based on the place values of the number. In this scheme, sorting is done on the less-significant digits first. When all the numbers are sorted on a more significant digit, numbers that have the same digit in that position but different digits in a less-significant position are already sorted on the less-significant position.

**Heap Sort:** In this method, the file to be sorted is interpreted as a binary tree. Array, which is a sequential representation of binary tree, is used to implement the heap sort.

The basic premise behind sorting an array is that its elements start out in some random order and need to be arranged from lowest to highest.

**Selection sort:** In this technique, the first element is selected and compared with all other elements. If any other element is less than the first element swapping should take place. By the end of this comparison, the least element most top position in the array. This is known as pass1. In pass II, the second element is selected and compared with all other elements. Swapping takes place if any other element is less than selected element. This process continuous until array is sorted. The no. of passes in array compare to size of array –1.

**Bubble sort:** This technique compares last element with the preceding element. If the last element is less than that of preceding element swapping takes place. Then the preceding element is compared with that previous element. This process continuous until the II and I elements are compared with each other. This is known as pass 1. This way the number of passes would be equal to size of array –1.



void quickSort(int list[], int arraySize)

{

 if (arraySize > 1)

 {

 select a pivot;

 partition list into list1 and list2 such that

 all elements in list1 <= pivot and all elements

 in list2 > pivot;

 quickSort on list1;

 quickSort on list2;

 }

}



***Q5 B) Define a priority queue. Write and algorithm to***

1. ***Insert an element in priority queue.***
2. ***Delete an element form priority queue.***

***Q6 A) What is binary search tree. Give an algorithms to***

1. ***Insert a node in BST.***
2. ***Find the smallest node in BST.***

**Answer.** A binary search tree is a binary tree with a special property called the BST-property, which is given as follows:

1. For all nodes x and y, if y belongs to the left subtree of x, then the key at y is less than the key at x, and if y belongs to the right subtree of x, then the key at y is greater than the key at x. We will assume that the keys of a BST are pairwise distinct.

 Each node has the following attributes:

• p, left, and right, which are pointers to the parent, the left child, and the right child, respectively, and

 • key, which is key stored at the node.

**1)Algorithm to insert a node in BST.**

Suppose that we need to insert a node z such that k = key[z]. Using binary search we find a nil such that replacing it by z does not break the BST-property.

BST-Insert(x, z, k)

 1: if x = nil then return “Error”

2: y ← x

3: while true do {

4: if key[y] < k

5: then z ← left[y]

6: else z ← right[y]

 7: if z = nil break

8: }

9: if key[y] > k then left[y] ← z

10: else right[p[y]] ← z

**1)Algorithm to find smallest node in BST.**

1: if x = nil then return (“Empty Tree”)

2: y ← x

3: while left[y] 6= nil do y ← left[y]

4: return (key[y])

Q6 B) Define a B-Tree. Construct a B-Tree of order three for the following data values arriving in the sequence 67, 32, 18, 29, 93, 89, 97, 91, 34, 55, 83.

**Answer:** A B-tree of order m is a multi-way search tree of order m such that:

• All leaves are on the bottom level.

• Each non-root node contains at least (m-1)/2 keys

 • Each node can have at most m children

• For each node, if k is the actual number of children in the node, then k - 1 is the number of keys in the node

***Q7 A)***

1. ***Find the minimum spanning tree using Prim’s algorithm***
2. ***Find the shortest vertex path from vertex B to all other nodes using Dijkstra’s algorithm***



**Answer**

***Q7 B) Explain the difference between***

1. ***tree and graph***
2. ***ordinary queue and circular queue***

Answer:

1. difference between tree and graph

|  |  |  |
| --- | --- | --- |
|  | **Trees** | **Graphs** |
| **1** | **A tree is a data structure that has a set of nodes linked to each other.** | **A graph can be defined as the set of vertices and there is a binary relation between these vertices.** |
| **2** | **Tree is special form of graph i.e. minimally connected graph and having only one path between any two vertices** | **In graph there can be more than one path i.e. graph can have uni-directional or bi-directional paths (edges) between nodes** |
| **3** | **In tree there is exactly one root node and every child have only one parent.** | **In graph there is no such concept of root node.** |
| **4** | **Trees are less complex then graphs as having no cycles, no self-loops and still connected.** | **Graphs are more complex in compare to trees as it can have cycles, loops etc** |
| **5** | **Different types of trees are : Binary Tree , Binary Search Tree, AVL tree, Heaps.** | **Different types of trees are : Binary Tree , Binary Search Tree, AVL tree, Heaps.** |
| **6** | **Tree always has n-1 edges.** | **no. of edges depend on the graph.** |
| **7** | **Tree is a hierarchical model.** | **Graph is a network model.** |
| **8** |  |  |

1. ordinary queue and circular queue

|  |  |  |
| --- | --- | --- |
|  | ordinary queue | circular queue |
| 1 |  |  |
| 2 | Queue is a FIFO(first in first out) buffer, i.e. when you remove an element you get the oldest element you pushed in | Queue is usually implemented (For instance in STL) is we connect the Rear node back to the front of the queue and make it circular. |
| 3 | if there is a single element in the rear,the queue is full.the other space is wasted. | no space is wasted at all |
| 4 | a new task is inserted at the end of the list, while a deletion is made at the front of the list | insertions and deletions can happen at any position in the queue and not necessarily in a sequential order. |
| 5 | In a linear queue, for a new insertion at the end, there must be an empty space at the front and all elements in between must move up one space to create vacancy a for the new insertion. Every time there is a new insertion, the steps have to be repeated. Insertion and deletion are thus two different steps. This approach is time-consuming and computationally expensive. | in a circular queue, insertion and deletion can happen simultaneously. Not expensive. |

Operating system

Q2. A)

Deadlocks are a set of blocked processes each holding a resource and waiting to acquire a resource held by another process.

Deadlocks can be avoided by avoiding at least one of the four conditions, because all this four conditions are required simultaneously to cause deadlock.

**Mutual Exclusion**

Resources shared such as read-only files do not lead to deadlocks but resources, such as printers and tape drives, requires exclusive access by a single process.

**Hold and Wait**

In this condition processes must be prevented from holding one or more resources while simultaneously waiting for one or more others.

**No Preemption**

Preemption of process resource allocations can avoid the condition of deadlocks, where ever possible.

**Circular Wait**

Circular wait can be avoided if we number all resources, and require that processes request resources only in strictly increasing(or decreasing) order.

The above points focus on preventing deadlocks. But what to do once a deadlock has occured. Following three strategies can be used to remove deadlock after its occurrence.

**Preemption**

We can take a resource from one process and give it to other. This will resolve the deadlock situation, but sometimes it does causes problems.

**Rollback**

In situations where deadlock is a real possibility, the system can periodically make a record of the state of each process and when deadlock occurs, roll everything back to the last checkpoint, and restart, but allocating resources differently so that deadlock does not occur.

**Kill one or more processes**

This is the simplest way, but it works.

Q3.a)

The process scheduling is the activity of the process manager that handles the removal of the running process from the CPU and the selection of another process on the basis of a particular strategy.

Process scheduling is an essential part of a Multiprogramming operating system. Such operating systems allow more than one process to be loaded into the executable memory at a time and loaded process shares the CPU using time multiplexing.

Schedulers

Schedulers are special system softwares which handles process scheduling in various ways.Their main task is to select the jobs to be submitted into the system and to decide which process to run. Schedulers are of three types

Long Term Scheduler

Short Term Scheduler

Medium Term Scheduler

Long Term Scheduler

It is also called job scheduler. Long term scheduler determines which programs are admitted to the system for processing. Job scheduler selects processes from the queue and loads them into memory for execution. Process loads into the memory for CPU scheduling. The primary objective of the job scheduler is to provide a balanced mix of jobs, such as I/O bound and processor bound. It also controls the degree of multiprogramming. If the degree of multiprogramming is stable, then the average rate of process creation must be equal to the average departure rate of processes leaving the system.

On some systems, the long term scheduler may not be available or minimal. Time-sharing operating systems have no long term scheduler. When process changes the state from new to ready, then there is use of long term scheduler.

Short Term Scheduler

It is also called CPU scheduler. Main objective is increasing system performance in accordance with the chosen set of criteria. It is the change of ready state to running state of the process. CPU scheduler selects process among the processes that are ready to execute and allocates CPU to one of them.

Short term scheduler also known as dispatcher, execute most frequently and makes the fine grained decision of which process to execute next. Short term scheduler is faster than long term scheduler.

Medium Term Scheduler

Medium term scheduling is part of the swapping. It removes the processes from the memory. It reduces the degree of multiprogramming. The medium term scheduler is in-charge of handling the swapped out-processes.

Q6 a)

difference between Internal and External Fragmentation

• Internal Fragmentation occurs when a fixed size memory allocation technique is used. External fragmentation occurs when a dynamic memory allocation technique is used.

• Internal fragmentation occurs when a fixed size partition is assigned to a program/file with less size than the partition making the rest of the space in that partition unusable. External fragmentation is due to the lack of enough adjacent space after loading and unloading of programs or files for some time because then all free space is distributed here and there.

• External fragmentation can be mined by compaction where the assigned blocks are moved to one side, so that contiguous space is gained. However, this operation takes time and also certain critical assigned areas for example system services cannot be moved safely. We can observe this compaction step done on hard disks when running the disk defragmenter in Windows.

• External fragmentation can be prevented by mechanisms such as segmentation and paging. Here a logical contiguous virtual memory space is given while in reality the files/programs are splitted into parts and placed here and there.

• Internal fragmentation can be maimed by having partitions of several sizes and assigning a program based on the best fit. However, still internal fragmentation is not fully eliminated.

Q4 b)

Definition of Operating System:

 An Operating system is a program that controls the

execution of application programs and acts as an interface

between the user of a computer and the computer hardware.

 A more common definition is that the operating system is the

one program running at all times on the computer (usually

called the kernel), with all else being applications programs.

 An Operating system is concerned with the allocation of

resources and services, such as memory, processors,

devices and information. The Operating System

correspondingly includes programs to manage these

resources, such as a traffic controller, a scheduler, memory

management module, I/O programs, and a file system.

1.2.2 Functions of Operating System

Operating system performs three functions:

1. Convenience: An OS makes a computer more convenient

to use.

2. Efficiency: An OS allows the computer system resources to

be used in an efficient manner.

3. Ability to Evolve: An OS should be constructed in such a

way as to permit the effective development, testing and

introduction of new system functions without at the same

time interfering with service.

 Every computer must have an operating system to run other

programs. The operating system and coordinates the use of

the hardware among the various system programs and

application program for a various users. It simply provides an

environment within which other programs can do useful

work.

 The operating system is a set of special programs that run

on a computer system that allow it to work properly. It

performs basic tasks such as recognizing input from the

keyboard, keeping track of files and directories on the disk,

sending output to the display screen and controlling a

peripheral devices.

Q5 b)

Passive

Attacks Passive attacks are in the nature of eavesdropping on, or monitoring of, transmissions. The goal of the opponent is to obtain information that is being transmitted. Two types of passive attacks are release of message contents and traffic analysis. The release of message contents is easily understood (Figure 1.3a). A telephone conversation, an electronic mail message, and a transferred file may contain sensitive or confidential information. We would like to prevent an opponent from learning the contents of these transmissions.

A second type of passive attack, traffic analysis, is subtler (Figure 1.3b). Suppose that we had a way of masking the contents of messages or other information traffic so that opponents, even if they captured the message, could not extract the information from the message. The common technique for masking contents is encryption. If we had encryption protection in place, an opponent might still be able to observe the pattern of these messages. The opponent could determine the location and identity of communicating hosts and could observe the frequency and length of messages being exchanged. This information might be useful in guessing the nature of the communication that was taking place. Passive attacks are very difficult to detect because they do not involve any alteration of the data. Typically, the message traffic is sent and received in an apparently normal fashion and neither the sender nor receiver is aware that a third party has read the messages or observed the traffic pattern. However, it is feasible to prevent the success of these attacks, usually by means of encryption. Thus, the emphasis in dealing with passive attacks is on prevention rather than detection.

Active

Active attacks involve some modification of the data stream or the creation of a false stream and can be subdivided into four categories: masquerade, replay, modification of messages, and denial of service. A masquerade takes place when one entity pretends to be a different entity (Figure 1.4a). A masquerade attack usually includes one of the other forms of active attack. For example, authentication sequences can be captured and replayed after a valid authentication sequence has taken place, thus enabling an authorized entity with few privileges to obtain extra privileges by impersonating an entity that has those privileges.

Accounts

Q2 a)

Methods of Cost Accounting signify the systems used to assign cost elements to cost objects. These are the procedures by which product costs are accumulated. Different methods of cost 182 determination are used because business vary in their nature and the type of products or services they produce. Following are the different methods of costing.

Job costing and Batch Costing: Job costing is designed to accumulate cost data for a manufacturing firm which produces goods to specific order. It is also known as specific orders costing or production order costing. According to “ICMA”, London, it is that category of basic costing method which is applicable where the work consists of separate contract job or batches each of which is authorized by specific order or contract. It is followed by manufacturing and nonmanufacturing concerns. It is employed in industries in which – a) A production is done on the basis of customer‟s own specifications. b) Products are manufactured in distinguishable lots. c) Products are not uniform. d) It is practical to maintain a separate record of each lot from the time production is begun until it is completed. Following is the list of concerns which generally employ job costing method. a) Printing Work. b) Design Engineering Concerns. c) Repair Works. d) Construction companies. e) Furniture makers. f) Hardware industry. g) Automobile garages. h) Interior decoration etc. Batch Costing It is a form of job costing in which a batches of identical products is taken as the cost unit. It is used when production consists of limited repetition work and a definite number of articles are manufactured in each batch to be held in stock for sale to customers generally. Thus batch is a cost unit consisting of a group of identical units. Batch costing is applied in the manufacture of shoes, readymade garments, component parts of cars, radios, watches etc and manufacture of drugs, engineering equipments etc. 183

For eg. in foot wear industry it is not just economical to manufacture a pair of shoes to meet the requirement of one customer. But batches say 500 to 5000 shoes of each size, style colour etc are economically made and held in stock for sale on demand.

Contract Costing: It is a method of costing in which each contract is taken as a separate costing unit for the purpose of cost ascertainment and control. The objective is find out the Profit or loss on each contract separately. Contract costing is employed in business undertakings engaged in building construction, road construction, bridge construction, dam construction and other civil engineering works, ship building etc. Contracts are generally of large size. A contract generally takes more than one year to complete. Work on contract is carried out at the site of the contracts and not in factory premises. Payments by the customer (contractee) are made at various stages of completion of the contract based on architects certificate for the completed stage.

Process Costing: It is a method of costing used to ascertain the cost of the product at each process operation or stage of manufacture where processes are carried on. According to ICMA London, “It is that form of operation costing where standardized goods are produced.” Process costing is used to ascertain the cost of product at each stage of manufacture where material is passed through various operations to obtain a final product. This method of costing is used by those concern which manufacture articles of uniform standards. These concerns manufacture articles on a continuous flow basis. Each process is treated as a cost centre and separate account is opened for each process. All costs related to a process are debited to its process account. The output passing through the process is also recorded. The output of one process becomes the input of next process and so on until the finished product is obtained. This method is suitable for Textile mills, Chemical works, Oil refining, Cement manufactures, Paper Manufacture, Steel production, Paint manufacture, Sugar works, Plastic manufactures etc.

Single (output) or unit costing: 184 It is a method of costing in which cost is ascertained in convenient units of product turned out by continuous manufacturing activity. The unit of costing is chosen according to the nature of product. This method of costing is used in those industries, in which the production consists of a single product or a few varieties of the same product with variations in size, shape, quality etc. and production is uniform and on continuous basis. Examples of industries in which this method is commonly used are : Cement, Steel, Sugar, Paper brick works, dairies etc. Cost of units in these industries are a tonne of cement, or steel, or sugar, 1000 bricks, a gallon of milk etc. This method is also known as single costing.

Operating Costing: It is a method of costing which is used in those industries, which are engaged in providing services such as transport, electricity etc. The cost of providing a service is termed as operating cost. Operating costing is used in those industries, where services rendered to customers are of unique and standardized type. The selection of a suitable cost unit (unit of service) is very important. The cost unit may be different for different type of industries. A few examples are given below. Undertakings Cost Unit Transport Per passenger km Hospital Per bed per day Hotel Per room per day Electricity Per kilowatt hour Cinema Per seat per show 8.8.5 Operation Costing: Under this method each operation is treated as a cost centre. Costs are accumulated in each operation instead of each process. This method is used by industries engaged in repetitive mass production with continuous flow of work. These industries could be those engaged in the manufacture of leather products, toys, bicycles, ceiling fans, weighing machines etc.

Q3 a)

A company's cash balance at bank and its cash balance according to its accounting records usually do not match. This is due to the fact that, at any particular date, checks may be outstanding, deposits may be in transit to the bank, errors may have occurred etc. Therefore companies have to carry out bank reconciliation process which prepares a statement accounting for the difference between the cash balance in company's cash account and the cash balance according to its bank statement.

Following are the transactions which usually appear in company's records but not in the bank statement:

**Deposits in Transit:** Deposits which have been sent by the company to the bank but have not been received by the bank at proper time before the issuance of bank statement.

**Checks Outstanding:** Checks which have been issued by the company but were not presented or cleared before the issuance of bank statement.

Following are the transactions which usually appear in bank statement but not in company's cash account:

**Service Charges:** Service charges may have been deducted by the bank. Such charges are usually not known to the company before the issuance of bank statement.

**Interest Income:** If any interest income has been earned by the company on its bank account, it is not usually entered in company's cash account before the issuance of bank statement.

**NSF Checks:** NSF stands for "not sufficient funds". These are the checks deposited by the company in bank account but the bank is unable to receive payment on those checks due to insufficient funds in the payer's account.

Q4 a)

**Solvency Ratios**

Solvency Ratios are quick and easy to calculate and easy to interpret.

The objective is to see whether a company has enough cash, assets and low debt to continue operations without running into financial trouble.

**Quick Ratio**

***Quick Ratio =  (Current Assets – Inventories) / Current Liabilities***

The quick ratio measures a company’s ability to meet its short-term obligations with its most liquid assets. The higher the quick ratio, the better the position of the company.

**Current Ratio**

***Current Ratio = Current Assets / Current Liabilities***

An even simpler variant to the quick ratio and is used to determine the company’s ability to pay back its short term liabilities. You’ll see this balance sheet ratio everywhere.

If the ratio is below 1, it raises a warning sign as to whether the company is able to pay its short term obligations when due. It doesn’t mean the company will go bankrupt, but is something that has to be looked at. If a company has a low current ratio year after year, it could be a characteristic of the industry where companies operate and high debt levels.

**Debt/Equity Ratios**

***Total Debt/Equity Ratio = Total Liabilities / Shareholders Equity***

***Long Term Debt/Equity Ratio = Long Term Debt / Shareholders Equity***

***Short Term Debt/Equity Ratio = Short Term Debt / Shareholders Equity***

There are different variations of the debt to equity ratios, but the objective of these financial ratios is to determine how a company has been financing its growth.

A high ratio means that the company has been growing due to debt. Not all debt is bad, but if the number is exceedingly high, remember that the company has to pay off the loan as well as interest payments.

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An important factor to consider then is to determine whether the returns generated from the debt exceeds the cost of debt (i.e. interest).

**Activity Ratios**

Activity financial ratios measure how well a company is able to convert its assets in the balance sheet into cash or sales. By analyzing the activity ratios, you can see how efficient and well run a company is.

These financial metrics aren’t just for the company, but also measures the people behind the business and how well they are running the show.

**Days Sales Outstanding (DSO)**

***Days Sales Outstanding = (Receivables / Revenue) x 365***

Cash is king and a business capable of converting its receivables into cash quickly is a great sign of health and efficiency.

A low DSO number means that it takes a company fewer days to collect its accounts receivable. A high DSO number shows that a company is selling its product to customers on credit and taking longer to collect money.

**Days Inventory Outstanding (DIO)**

***Days Inventory Outstanding = (Inventory / COGS) x 365***

This financial ratio is used to measure the average number of days a company holds inventory before selling it.

This ratio is industry specific and should be used to compare competitors. A company like Boeing will have vastly different DIO than a company like Amazon where inventory turnover is high.

**Days Payable Outstanding (DPO)**

***Days Payable Outstanding = (Accounts Payable / COGS) x 365***

Days Payable Outstanding shows the time in days a business has to pay back its creditors. On the flip side, it also shows how long the company can utilize the cash before paying it back.

The longer a company can delay payments, the better.

**Cash Conversion Cycle**

***Cash Conversion Cycle = DIO + DSO – DPO***

 Putting DIO, DSO and DPO together, you get the cash conversion cycle.

The entire cash conversion cycle is a measure of management effectiveness. The lower the better, and a great way to compare competitors.

For a full explanation as well as company comparisons and examples, check out the article on [**cash conversion cycle**](http://www.oldschoolvalue.com/blog/accounting/the-cash-conversion-cycle-to-help-you-pick-winners-and-losers/).

Q 5 a)

1. Collect source documents

The very first step in the accounting cycle is to gather all the documents that are related to financial transactions of the organization. These documents, called source documents, are things like receipts, bank statements, checks, and purchase orders. They are the items that describe what a transaction was for.

2. Analyze transactions

The second step in the accounting cycle is to analyze the source documents. The purpose of this is to look them over and then decide what effect they have had on company accounts.

3. Journalize transactions

The third step in the accounting cycle is to post entries into the journal for the analyzed transactions. A journal is the book or electronic record that documents all the financial transactions for a company and the accounts that are affected by each transaction. When a journal entry is made, the 'double-entry' rule is used. This means that for every one transaction, at least two accounts are affected. There must be a debit and a credit for each transaction, and the total of debits and credits must equal the amount of the transaction. Journal entries are entered in chronological order, and debits are entered before credits.

4. Post transactions

The fourth step in the accounting cycle is to transfer information from the journal to the ledger. A ledger is a book or an electronic record of all the accounts that a company has. These accounts are broken down by account number and class. When the information from the journal is transferred to the ledger, it is transferred to each account that was affected by a transaction.

5. Prepare an unadjusted trial balance

A trial balance is a list of all the company's accounts and their balance at the time the trial balance is prepared. An unadjusted trial balance is a trial balance that is prepared before adjusting entries are made into accounts. This information comes directly from the ledger. The total debit balance and total credit balance must be equal.

6. Prepare adjusting entries

Adjusting entries are entries that are made in the journal and posted in the ledger. The purpose of these entries is to bring account balances to the proper amounts. Not all accounts will have an adjusting entry. Adjusting entries are made at the end of the accounting period but not the end of the accounting cycle.

7. Prepare trial balance

Remember, the trial balance is a list of all accounts and their balances after adjustments have been made. This trial balance is prepared to check and make sure that debits and credits equal after adjusting entries are made. It is used to prepare the financial statements.

8. Prepare financial statements

These are prepared in a specific order because information from one financial statement is often used in preparing another financial statement.

Communication and soft skills

Q2 b)

The Seven Principles of Business Correspondence.

**1.**       **Consideration / Conversational (Your attitude)**

Try to visualize your reader’s circumstances, problems, emotions, their desires etc. and indicate that you understand these by using your words with care. If you are writing a sales letter, show the recipient how the product would be beneficial for them. When you write with consideration, you generate goodwill.

**2.**       **Courtesy (Be courteous)**

Be courteous and polite. Avoid making negative statements and an accusatory tone accusing the recipient. eg. Instead of writing, “You did not send the cheque”, use “The cheque wasn’t enclosed.” Even if you are writing a complaint letter, your tone must be polite and courteous at all times.

**3.**       **Clarity (Be clear)**

One has to be clear and specific in their letter. The words used should be unambiguous and not vague. Avoid giving abstract information.

Eg. Instead of ‘visualize’, use ‘see’. Instead of ‘at the present time’, write ‘now’. Instead of using ‘the website is now fully operational with the e-commerce functionality setup’, write ‘the company has launched its website’.

**4.**       **Concreteness (Be convincing)**

A good business letter always provides concrete information (specific information).

Eg. Instead of saying,”I expect the consignment/order to reach me at the earliest”, use “I expect the order to be delivered to me by the 21st of March 2013.

**5.**       **Correctness**

While writing a business letter, the principle of correctness should be followed. The writer must ensure correctness in his tone, format and information that he provides in the letter. The facts mentioned must be true and correct. Grammatical structures and spellings should be correct.

**6.**       **Conciseness**

Use only necessary details and short sentences. Be direct and avoid long redundant expressions.

Use the “Keep it short and simple” formula.

**7.**       **Completeness**

Provide complete information in the letter.

Q3 a)

Setting goals is a fundamental component to long-term success. The basic reason for this is that you can’t get where you are trying to go until you clearly define where that is. Research studies show a direct link between goals and enhanced performance in business. Goals help you focus and allocate your time and resources efficiently, and they can keep you motivated when you feel like giving up.

Goals help employees stay aware of what is expected from them and leave little room for people to hide behind the curtain of unspecified expectations. Furthermore, setting and achieving goals translates to feelings of success for both individuals and companies, which in turn spurs greater productivity and confidence.

Here are some guidelines to keep in mind when your company sets out to make a list of goals:

**1. Make sure the goal is feasible and specific.**You should be able to visualize and taste and understand the result you are after. Athletes use visualization to help them achieve success. By visualizing your success with close attention to detail, you are preparing yourself and making sure you take the steps necessary to get there. You can also say affirmations over and over again to get you in the right head space. Be as thorough and clear as possible. Broad goals don’t add much value.

**2. Make sure the goal is measurable.** Trying to achieve a feeling (like being happy) or an ambiguous accomplishment gives you no way to measure your success. When possible, try to [quantify the results you are hoping to achieve](http://getlevelten.com/intel) with percentages, dollars or time. This will allow you to measure what you have achieved and readjust accordingly.

**3. Make sure the goal is in your hands.** This means you must be able to achieve the goal as a result of your own hard work and determination, or with the willing assistance of someone already in your network. If you have no control over the outcome, it does not make for a realistic goal. Unrealistic goals can ultimately lead to depression and low feelings of self-worth. Don’t put such important things in the hands of what is the equivalent of a slot machine. There must be an action, or several actions, you can perform that will enable you to achieve the goals you set.

**4. Make sure the goals are tied in together.** For example, it would not be realistic as a company to strive for a better work-life balance amongst employees and to also try to increase sales by 300% unless cuts are made in other departments. Pay attention to how each goal ties in with the others and make sure they are not mutually exclusive.

**5. Don’t go overboard.** At LevelTen, we work with a progress measurement index called velocity. We look at our history and how much we were able to achieve in a certain amount of time, and then try to set goals in the same ballpark. It’s okay to set one or two more goals if you honestly think you can push yourself, but planning for too much can overwhelm you and make your employees give up altogether. Know your own strengths and weaknesses and plan honestly so you don’t let your team down.

**6. Be flexible.** Assess your progress periodically, provide honest feedback and adjust as you go along. If you encounter roadblocks on your path to achieving your goals, don’t give up. Instead, be willing to alter them to meet your new needs. Don’t become rigid in accomplishing something that is no longer relevant to you or your business just for the sake of your ego. Sometimes knowing when to walk away or shift gears is progress in and of itself.

**7. Set goals for the long-term and short-term.** Ideally, you should set goals for the long-term, and then mini goals that are short-term and ultimately tie in with the bigger picture. Long-term goals can take approximately three to five years to achieve, while short-term goals could take anywhere from a couple months to a year or two. Differentiating between the two will help you from becoming overwhelmed or discouraged, and will also assist in always keeping the long-term perspective in mind when the day to day threatens to make you lose sight of it.

**8. Make sure you really want it.** A goal should be emotionally satisfying. It should tug at your heart strings. Making sure that you really want to accomplish the goals that you set will make you strive harder when the road gets tough. As an employer, this may take the form of you adding incentives that are personally meaningful to your employees. In your personal life, this will foster honest introspection and evaluation of what you really want to achieve. In order to become committed to a goal, one must believe in its importance or significance.

**9. Write it down.** A written goal represents a real commitment. Commitment is what separates our dreams from our goals. Keep a copy of your goal plan in sight and refer to it often. Harvard Business School researchers studied what made the difference in success or failure for people of similar backgrounds and educational standards. Their studies found that 3% of people were successful, 30% were moderately successful and 67% just existed. The significant difference for the 3% who were successful is that they wrote down specific goals. The 30% who were moderately successful had a general idea of where they were going but didn't have any goals formalized. The rest were happy to watch the world go by. What is interesting is that people in the 30% category only needed to put in a small amount of effort to jump into the next group. The secret behind the effort is the development of habits and strategies which support the achievement of clear goals. Successful people form habits to do the things that less successful people don't like to do.

**10. Set goals together and celebrate your victories as a team.** In order to increase motivation, employees need to be allowed to participate in the goal-setting process. That’s why it’s important to show employees that a particular goal makes a contribution to the organization’s success. Then, show employees your interest and support. The trick is to achieve a balance between giving employees total freedom and directing them every step of the way. Most importantly, when approaching completion of a goal, set a new one.

Goals will keep you performing at your best and should be a consistent part of your personal or business routine.

Q4 b)

**1. Use visual aids**

Using pictures in your presentations instead of words can double the chances of meeting your objectives.

**2. Keep it short and sweet**

There is an old adage that said – “No one ever complained of a presentation being too short.” Nothing kills a presentation more than going on too long.

There are some college professors who will penalise a short presentation (most lecturers see no problem in droning on) , but for most people a shorter presentation is better. Keep your presentation to under 22 minutes if you can.

**3. Use the rule of three**

A simple technique is that people tend to only remember three things. Work out what the three messages that you want your audience to take away and structure your presentation around them. Use a maximum of three points on a slide.

**4. Rehearse**

Practice makes for perfect performance. Many experts say that rehearsal is the biggest single thing that you can do to improve your performance. Perform your presentation out loud at least four times. One of these should be in front of a real scary audience. Family, friends or colleagues. Even the dog is better than nothing.

**5. Tell stories**

All presentations are a type of theatre. Tell stories and anecdotes to help illustrate points. It all helps to make your presentation more effective and memorable.

**6. Lose the bullet points – don’t put your speaker notes up on the screen**

Bullet points are the kiss of death for most presentations. Most people use bullet points as a form of speaker notes. To make your presentation more effective put your speaker notes in your notes and not up on the screen.

**7. Video yourself**

Set up a video camera and video yourself presenting. You will see all sorts of mistakes that you are making, from how you are standing, if you are jangling keys, to how well your presentation is structured.

**8**. **Know what slide is coming next**

You should always know when presenting which slide is coming up next. It sounds very powerful when you say “On the next slide [Click] you will see…”, rather than than a period of confusion when the next slide appears.

**9. Have a back-up plan**

Murphy’s law normally applies during a presentation. Technology not working, power cuts, projector blowing a bulb, spilling coffee on your front, not enough power leads, no loudspeakers, presentation displays strangely on the laptop – all of these are things that have happened in presentations that I have given.

Have a back-up plan. Take with you the following items – a printed out set of slides – (you can hold these up to the audience if you need to), a CD or data stick of your presentation, a laptop with your slides on it. Just in case it goes wrong.

Guess what? When you have back-ups – you seldom need to use them.

**10. Check out the presentation room**

Arrive early and check out the presentation room. If you can make sure that you see your slides loaded onto the PC and working on the screen. Work out where you will need to stand.

Q5 a)

A **manager** is a person in an organization who is responsible for carrying out the **four functions of management**, including planning, organizing, leading and controlling. You will notice that one of the functions is leadership, so you might ask yourself if it would be safe to assume that all managers are leaders. Theoretically, yes - all managers would be leaders if (and this is a big 'if') they effectively carry out their leadership responsibilities to communicate, motivate, inspire and encourage employees towards a higher level of productivity. However, not all managers are leaders simply because not all managers can do all of those items just listed. An employee will follow the directions of a manager for how to perform a job because they have to, but an employee will voluntarily follow the directions of a leader because they believe in who they are as a person, what they stand for and for the manner in which they are inspired by their leader. A manager becomes a manager by virtue of their position, and subordinates will follow the manager because of his or her job description and title.

Because managers are responsible for carrying out the four functions of management, their primary concern is to accomplish organizational goals. Managers get paid to get things done in organizations. As such, the manager is accountable for themselves as well as the behavior and performance of his or her employees. A manager has the authority and power to hire, promote, discipline and fire employees based on those behaviors and performance. Management is about efficiency and getting results though systems, processes, procedures, controls and structure.

Leader

Perhaps the greatest separation between management and leadership is that leaders do not have to hold a management position. That is, a person can become a leader without a formal title. Any individual can become a leader because the basis of leadership is on the personal qualities of the leader. People are willing to follow the leader because of who he or she is and what the leader stands for, not because they have to due to the authority bestowed onto him or her by the organization. The leader will show passion and personal investment in the success of his or her followers reaching their goals, which may be different from organizational goals.

A leader has no formal, tangible power over their followers. Power is awarded to the leader on a temporary basis and is contingent upon the leader's ability to continue to motivate and inspire followership. Notice the shift in terminology here: managers have subordinates, while leaders have followers. Subordinates do not have a choice but to listen to the demands and wishes of their managers, but following is (and always will be) a voluntary choice for those who follow a leader. Those who no longer wish to follow the leader will simply stop. That is, if an employee initially sees his or her manager as a leader and eventually ceases to be inspired by that manager, the employee will still obey the manager, but only because the employee is required to do so, not because he or she wants to.

Leadership is about effectiveness through trust, inspiration and people. Leaders often challenge the status quo that managers spend much of their time upholding to bring innovation to organizations. Leadership is visionary, change-savvy, creative, agile and adaptive. Managers are concerned with the bottom line, while leaders spend time looking at the horizon.

Q5 b)

power refers to A's ability to influence B, not A's right to do so; no right is implied in the concept of power... At this point it is useful to point out that power refers to A's ability to influence B, not A's right to do so; no right is implied in the concept of power. A related concept is authority. Authority does represent the right to expect or secure compliance; authority is backed by legitimacy. For purposes of differentiating between power and authority, let us examine the relationship between the manager of a sawmill and her subordinates. Presumably, the manager has the authority -- the right -- to request that the sawyer cut lumber to certain specifications. On the other hand, the manager would not have the right to request that the sawyer wash her car. However, that sawyer may well accede to her request that he wash her car. Why? It is possible that the sawyer responds to the power that the manager has over him -- the ability to influence his behavior. Classification of power : Etizoni has made the classification of power as follows: COERCIVE POWER : Involves forcing someone to comply with one's wishes. A prison would be an example of a coercive organization. UTILITARIAN POWER: Is power based on a system of rewards or punishments. Businesses, which use pay raises, promotions, or threats of dismissal, are essentially utilitarian organizations. NORMATIVE POWER : Is power which rests on the beliefs of the members that the organization has a right to govern their behavior. A religious order would be an example of a utilitarian organization.

ORGANIZATIONAL POLITICS To help us understand organizations, we might consider them as political systems. The political metaphor helps us understand power relationships in day-to-day organizational relationships. If we accept that power relations exist in organizations, then politics and politicking are an essential part of organizational life. Politics is a means of recognizing and, ultimately, reconciling competing interests within the organization. Competing interests can be reconciled by any number of means. For example, resorting to "rule by the manager" might be seen as an example of totalitarian rule. On the other hand, politics may be a means of creating a noncoercive, or a democratic work environment.

Institute of Distance and Open Learning (IDOL)

**University of Mumbai**



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**COLLEGE STAMP DATE**