



UNIT 13: MANAGING FINANCIAL PRINCIPLES AND TECHNIQUES

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- LO 2 : BE ABLE TO APPLY FORECASTING TECHNIQUES TO OBTAIN INFORMATION FOR DECISION MAKING

THE BASIC SYLLABUS

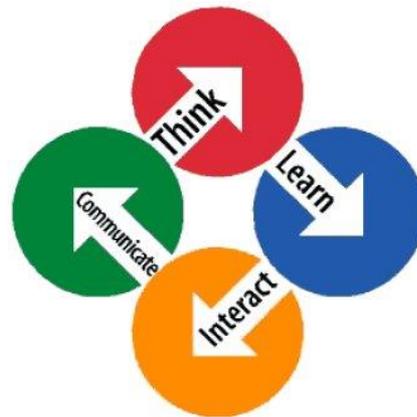


- 1. Be able to apply cost concepts to the decision making process.
- 2. Be able to apply forecasting techniques to obtain information for decision making.
- 3. Be able to participate in the budgetary process of an organisation.
- 4. Be able to recommend cost reduction and management processes for an organisation.
- 5. Be able to use financial appraisal techniques to make strategic investment decisions for an organisation.
- 6. Be able to interpret financial statements for planning and decision making.

Learning Objectives



- Be able to apply forecasting techniques to obtain information for decision making



- At the end of the class the students should be able to:-
- Apply forecasting techniques to make cost and revenue decisions in an organisation.

OVERVIEW



- Forecasts serve as decision support tools that allow leaders to plan for the future by performing “what-if” analyses to determine how changes in inputs affects outcomes. For example, forecasts help a business identify appropriate responses to changes in demand levels, price-cutting by the competition, economic ups and downs and more. To receive the most benefit from forecasts, leaders must understand the finer details of the different types of forecasting methods, recognise what a particular forecasting method type can and cannot do, and know what forecast type is best suited to a particular need.

FORECASTING COSTS



- After the different forecasted demand scenarios are put on paper, the next step is to analyse and plan for what your expected costs will be for the various levels of demand. By analysing and planning for costs ahead of time, you can get a much better sense for which projects are worth selling and which ones may not be so appealing.

CASH FLOW FORECAST



- A business can end a fiscal year showing a solid profit but still find itself out of money. A business that focuses too much on profit and not enough on cash flow can be doomed to fail. Receipts often lag behind sales, suppliers demand payments or else cut you off and loans become due. An accurate cash-flow forecast allows you to stay in business while you wait for the profit you see on your books to become reality.

SCATTER GRAPHS

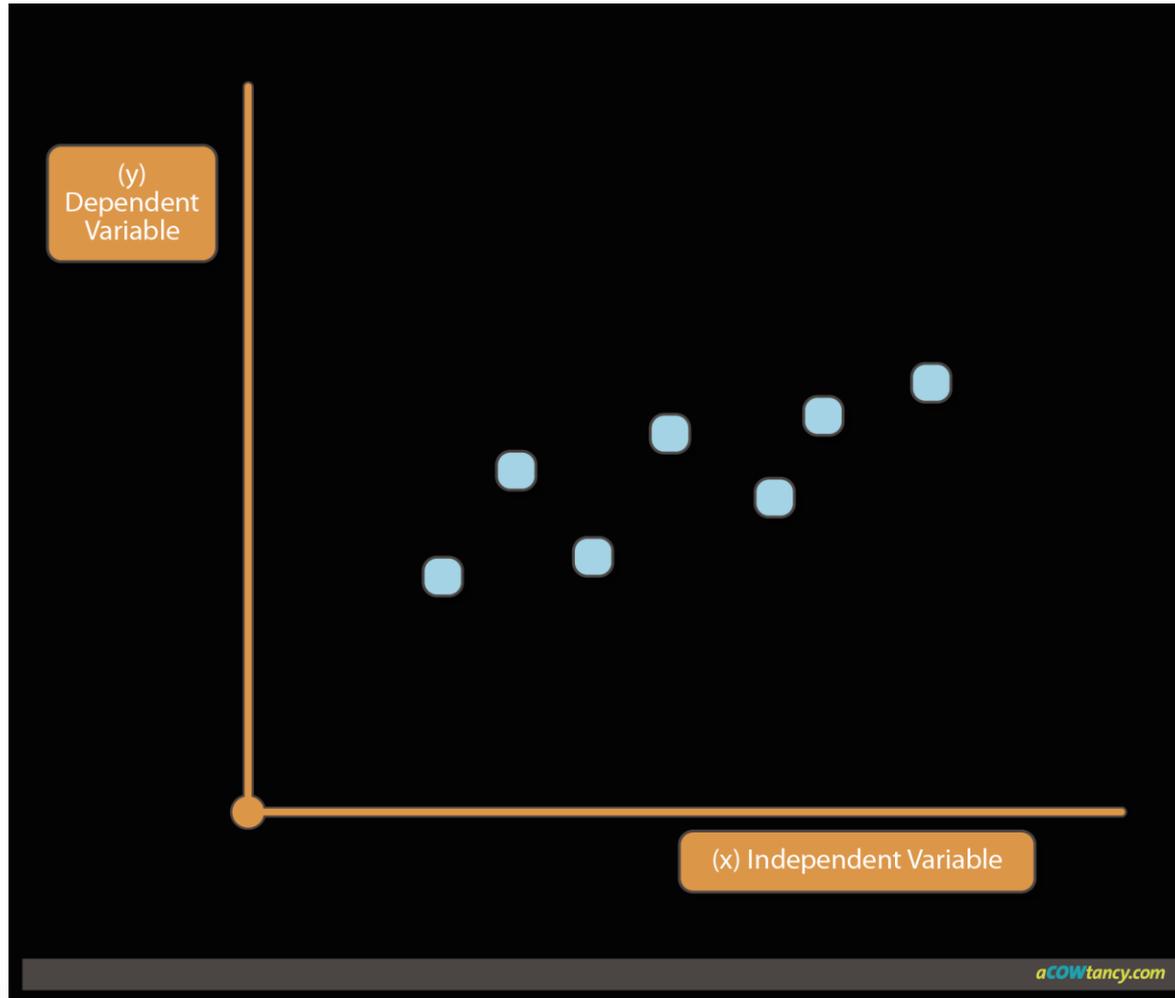


- Information about two variables that are considered to be related in some way can be represented on a form of graph known as a 'scatter diagram', each axis representing one variable.
- For example, the level of advertising expenditure and sales revenue of a product, or the level of electricity cost and the number of units produced can be plotted against each other.
- The values of the two variables are plotted together to show a number of points on the graph. The way in which these are scattered or dispersed indicates if any relationship is likely to exist between the variables.
- For example; the following scatter graph shows the relationship between 2 variables; the independent variable can be the units, the dependent variable can be production cost.

SCATTER GRAPHS



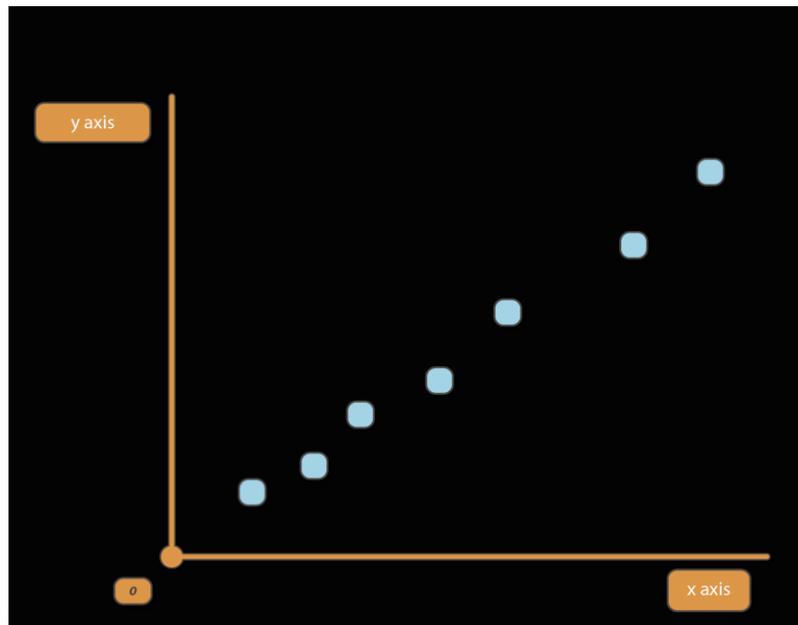
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SCATTER GRAPHS



- Line of Best Fit
- The "best-fit" line (trend line) is the straight line which passes as near to as many of the points as possible. By drawing such a line, we are attempting to minimise the effects of random errors in the measurements.
- For example, if our points look like this

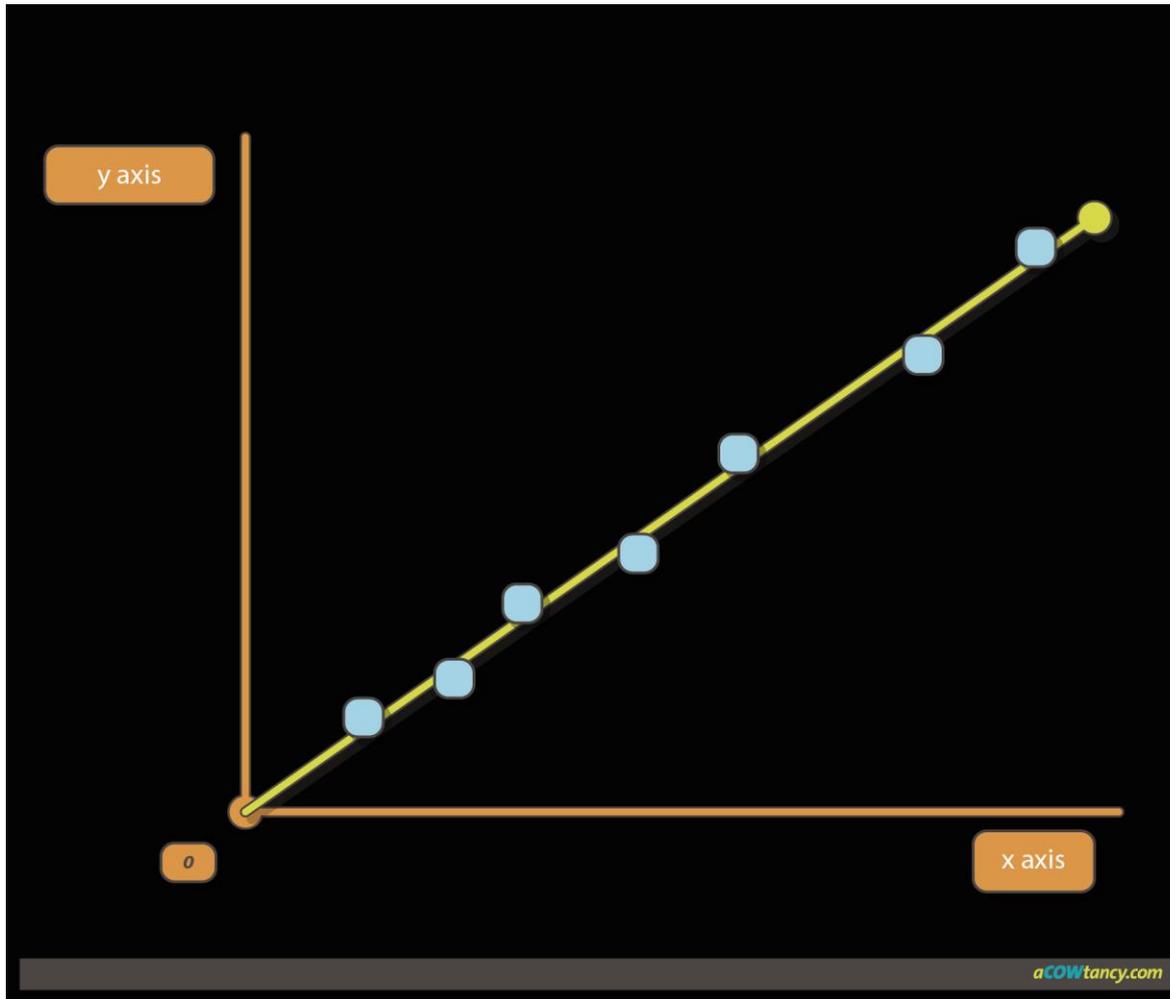


SCATTER GRAPHS

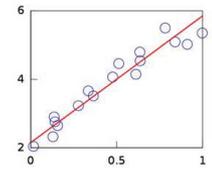


- When we have our line of best fit drawn on the scatter diagram, we can use it to read off values for the variables at any points on the axes.
- In doing this, we have to assume that the line of best fit is accurately drawn and that the relationship established, based on past data, will also apply in the future - this is known as extrapolating the trend.
- Using scatter diagrams with lines of best fit is useful as a forecasting technique and has the advantage of relative simplicity.

SCATTER GRAPHS

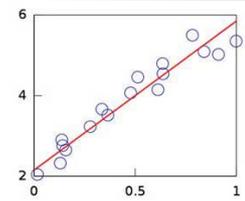


LINEAR REGRESSIONS



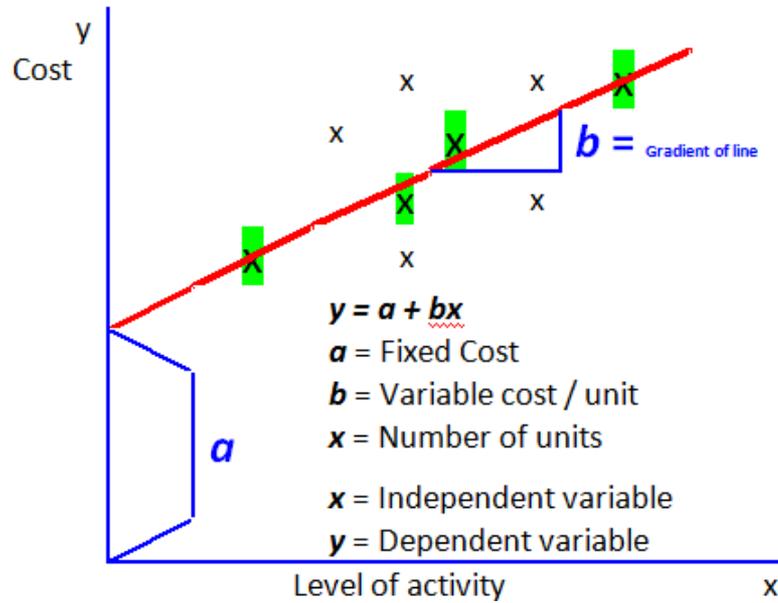
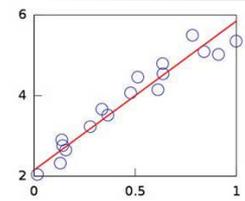
- To describe the linear association between quantitative variables, a statistical procedure called regression often is used to construct a model. Regression is used to assess the contribution of one or more “explanatory” variables (called independent variables) to one “response” (or dependent) variable. It also can be used to predict the value of one variable based on the values of others. When there is only one independent variable and when the relationship can be expressed as a straight line, the procedure is called simple linear regression.

LINEAR REGRESSIONS

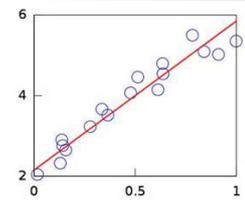


- Least squares linear regression is a method of fitting a straight line to a set of points on a graph. Typical pairs of graph axes could include:
 - total cost v volume produced
 - quantity sold v selling price
 - quantity sold v advertising spend.
- The general formula for a straight line is $y = ax + b$. So, 'y' could be total cost and 'x' could be volume. 'a' gives the slope or gradient of the line (eg how much the cost increases for each additional unit), and 'b' is the intersection of the line on the y axis (the cost that would be incurred even if production were zero).

LINEAR REGRESSIONS



LINEAR REGRESSIONS



- **FORMULAE:**

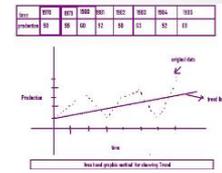
- $b = \frac{n\sum xy - \sum x \sum y}{n\sum x^2 - (\sum x)^2}$

- $a = \frac{\sum y}{n} - b \frac{\sum x}{n}$

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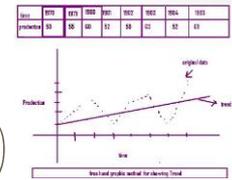
- $a = \frac{\sum y}{n} - b \frac{\sum x}{n}$

TIME SERIES METHOD



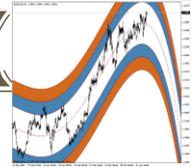
- Time-series methods make forecasts based solely on historical patterns in the data. Time-series methods use time as independent variable to produce demand. In a time series, measurements are taken at successive points or over successive periods. The measurements may be taken every hour, day, week, month, or year, or at any other regular (or irregular) interval. A first step in using time-series approach is to gather historical data. The historical data is representative of the conditions expected in the future. Time-series models are adequate forecasting tools if demand has shown a consistent pattern in the past that is expected to recur in the future. For example, new homebuilders in Jamaica may see variation in sales from month to month. But analysis of past years of data may reveal that sales of new homes are increased gradually over period of time. In this case trend is increase in new home sales.

TIME SERIES METHOD



- Time series models are characterised of four components: trend component, cyclical component, seasonal component, and irregular component. Trend is important characteristics of time series models. Although times series may display trend, there might be data points lying above or below trend line. Any recurring sequence of points above and below the trend line that last for more than a year is considered to constitute the cyclical component of the time series—that is, these observations in the time series deviate from the trend due to fluctuations. The real Gross Domestic Product (GDP) provides good examples of a time series that displays cyclical behavior. The component of the time series that captures the variability in the data due to seasonal fluctuations is called the seasonal component.

FORECASTING AND PRICE MOVEMENTS



- Forecasting can be broadly considered as a method or a technique for estimating many future aspects of a business or other operation. There are numerous techniques that can be used to accomplish the goal of forecasting. For example, a retailing firm that has been in business for 25 years can forecast its volume of sales in the coming year based on its experience over the 25-year period—such a forecasting technique bases the future forecast on the past data.
- A change in the price of a security or other asset, especially in the short term. For example, whether a stock rises or falls on Monday, it undergoes price movements throughout the trading day.

USING INDICES



- The CPI is the most widely used measure of inflation and is sometimes viewed as an indicator of the effectiveness of government economic policy. It provides information about price changes in the nation's economy to government, business, labour, and other private citizens, and is used by them as a guide to making economic decisions. In addition, the Minister of Finance Bank Of Jamaica and Planning Institute of Jamaica , use trends in the CPI to aid in formulating fiscal and monetary policies.

LIMITATIONS OF USING INDICES



- They are simply rough indications of the relative changes.
- The choice of representative commodities may lead to fallacious conclusions as they are based on samples.
- There may be errors in the choice of base periods or weights etc.
- Comparisons of changes in variables over long periods are not reliable.
- They may be useful for one purpose but not for other.
- They are specialized types of averages and hence are subject to all those limitations with which an average suffers from.

FORECASTING PROBLEMS AND LIMITATIONS



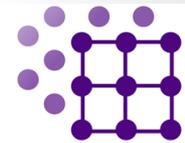
- When business customers are ready to buy an item, it's common for them to want to purchase the item as soon as possible. If one business doesn't have the product in stock, the customer will probably look elsewhere. To prevent losing a sale or a customer to another business, a company should forecast customer demand to ensure the business has the desired products in stock. The company whose qualitative sales forecast and inventory plan is correct will be more successful than the business that attempts to guess the market demand and appropriate stock levels. However, qualitative forecasting relies on subjective inputs and, therefore, it's not without its problems.

PLACE OF QUALITATIVE DATA



- Qualitative data consist of words and observations,
- not numbers. As with all data, analysis and
- interpretation are required to bring order and
- understanding. This requires creativity, discipline
- and a systematic approach. There is no single or
- best way.
- Your process will depend on:
 - ■ the questions you want to answer,
 - ■ the needs of those who will use the information,
- and
- ■ your resources.

PLACE OF QUALITATIVE DATA



- Qualitative modes of data analysis provide ways of discerning, examining, comparing and contrasting, and interpreting meaningful patterns or themes. Meaningfulness is determined by the particular goals and objectives of the project at hand: the same data can be analyzed and synthesized from multiple angles depending on the particular research or evaluation questions being addressed. The varieties of approaches - including ethnography, narrative analysis, discourse analysis, and textual analysis - correspond to different types of data, disciplinary traditions, objectives, and philosophical orientations. However, all share several common characteristics that distinguish them from quantitative analytic approaches.
- We have few agreed-on canons for qualitative data analysis, in the sense of shared ground rules for drawing conclusions and verifying their sturdiness (Miles and Huberman, 1984).

RECOMMENDATIONS



- When identifying recommendations to make, consider how you can leverage your unique strengths in the current environment. Have there been any recent legal or competitive changes that may present a new opportunity to expand your market or improve your competitive edge? How can you convert your weaknesses into strengths? For example, if you're overly dependent on a single product, then consider diversifying your products and expanding into new markets. Consider your research on the current market conditions and align your strategy to make the most of your strengths within your available resources and timing of opportunities.

REVISION QUESTIONS



- 1. Observed costs at different production levels were as follows:-

X (UNITS) OUTPUT	Y (\$'000) TOTAL COSTS	XY (\$'000)	X ²	Y ² (\$'000)
280	46.5			
350	49.1			
200	36.7			
160	32.0			
240	44.5			

REVISION QUESTIONS



- Required:
- (a) Calculate the regression line.
- (b) Use the line estimate costs for output of 240 units and 700 units

REVISION QUESTIONS



Section B – ALL FIVE questions are compulsory and MUST be attempted

- 1 A company is seeking to establish whether there is a linear relationship between the level of advertising expenditure and the subsequent sales revenue generated.

Figures for the last eight months are as follows:

Month	Advertising Expenditure £000	Sales Revenue £000
1	2.65	30.0
2	4.25	45.0
3	1.00	17.5
4	5.25	46.0
5	4.75	44.5
6	1.95	25.0
7	3.50	43.0
8	3.00	38.5
Total	<u>26.35</u>	<u>289.5</u>

Further information is available as follows:

$$\Sigma (\text{Advertising Expenditure} \times \text{Sales Revenue}) = \text{£}1,055.875$$

$$\Sigma (\text{Advertising Expenditure})^2 = \text{£}101.2625$$

$$\Sigma (\text{Sales Revenue})^2 = \text{£}11,283.75$$

All of the above are given in £ million.

Required:

- (a) On a suitable graph plot advertising expenditure against sales revenue or *vice versa* as appropriate. Explain your choice of axes. (5 marks)
- (b) Using regression analysis calculate a line of best fit. Plot this on your graph from (a). (5 marks)

(10 marks)

REVISION QUESTIONS



YEAR	QUARTER	ACTUAL VOLUME OF SALES '000 UNITS	MOVING TOTAL OF 4 QUARTERS' SALES '000 UNITS	MOVING AVERAGE OF 4 QUARTERS' SALES '000 UNITS	MID-POINT OF 2 MOVING AVERAGES TREND LINE '000 UNITS
	1	700			
2005	2	940			
	3	520			
	4	620			
2006	1	840			
	2	960			

REVISION QUESTIONS



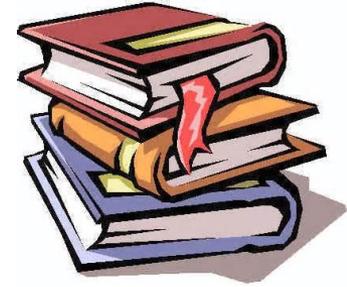
YEAR	QUARTER	ACTUAL VOLUME OF SALES '000 UNITS	MOVING TOTAL OF 4 QUARTERS' SALES '000 UNITS	MOVING AVERAGE OF 4 QUARTERS' SALES '000 UNITS	MID-POINT OF 2 MOVING AVERAGES TREND LINE '000 UNITS
	3	520			
2006	4	640			
	1	840			
2007	2	900			
	3	630			
	4	670			

REVISION QUESTION



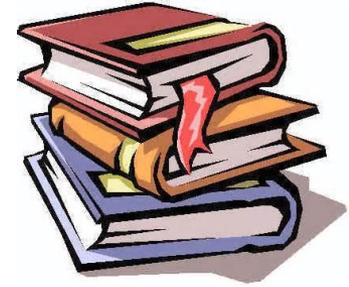
In respect of the trend in sales that was computed above, what can be said about the trend in sales of International Ltd.?

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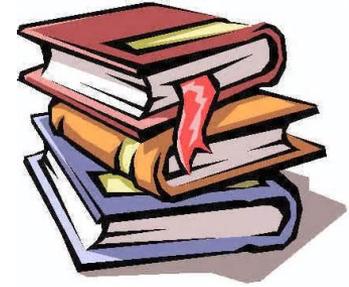
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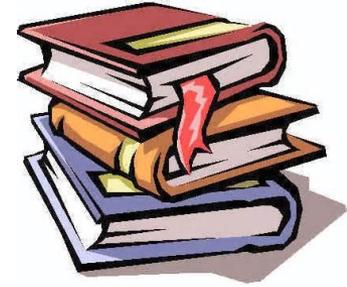
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