CS625 PROFESSIONAL PRACTICES

(PREPARED BY VURANK)

- **Profession**: A paid occupation, especially one that involves prolonged training and a formal qualification.
- **Professional**: A professional is a member of a profession or any person who earns their living from a specified professional activity. The term also describes the standards of education and training that prepare members of the profession with the particular knowledge and skills necessary to perform their specific role within that profession.

Professional Responsibilities:

- With reference to Information Technology, Computer Science or Software Engineering, the responsibilities of working professionals in this area include network administration, software development and installation, and the planning and management of an organization's technology life cycle, by which hardware and software is maintained, upgraded and replaced.
- But these are not ENOUGH.

Engineering *Council states that other than professional Knowledge, an Engineer must know:*

- Technical decision making and its commercial and economic implementation;…knowledge of government legislation affecting work, e.g. safety, health, environmental requirements; an understanding of the principles of management and industrial relations; some knowledge of trade unions and their organization; an understanding of the engineer's responsibility to the profession, to the community and to the environment

The Professionalism:

- A profession isn't just what you do, it's who you are.
- Professionalism is a way of thinking and living rather than an accumulation of learning.

Traits of a Profession:

Four Traits of Profession

1. Varied activities requiring special skills
2. Society-centric motivation
3. Personal standards of excellence
4. Giving back to society

A professional behaves ethically:

- ❑ Ethics means something more than 'law' and 'morals'.
- ❑ It carries an additional connotation of 'rightness'.
    - Breaking the law: can earn a fine or jail time
    - Breaking a moral: can ruin your reputation
    - Breaking an ethic: can ruin your conscience

It's possible to break all three, simultaneously!

Traits of a Professional:

- ❑ Being a professional means that they are certain traits which are expected from you.
- ❑ We will go through Each of them

Trait # 1 of a professional: Seriousness

- ❑ Serious about job
- ❑ The job is only a job. A means to an end

Trait # 2 of a professional: Wanting to do better:

- ❑ Exhibit a never-ending quest to improve their performance in every variable, every project, every relationship, and every detail.

Trait # 3 of a professional: Dealing with the Unexpected

- ❑ Stuff happens, things change, and the true professional rises to the occasion

Trait # 4 of a professional: Communication Skills:

- ❑ Clear
- ❑ Concise
- ❑ Confident

Trait # 5 of a professional: Enthusiasm:

- ❑ Attitude is everything. Those who exhibit enthusiasm for what they do and greet each day with a positive attitude inevitably become a leader

Trait # 6 of a professional: Helpfulness:

- ❑ Understand that real success in the workplace requires teamwork
- ❑ Always ready to lend a hand
- ❑ Make a suggestion
- ❑ Offer a compliment when it's deserved

Trait # 7 of a professional: Taking the Initiative:

- ❑ Takes the initiative to get things done

Trait # 8 of a professional: Cool under Pressure:

- ❑ Level headed and calm
- ❑ Cheerful demeanor-even under stressful times

Trait # 9 of a professional: Remains Focused:

- ❑ Stay focused on the task at hand and the goal ahead
- ❑ Navigate through obstacles or setbacks but never lose sight of where they headed

Trait # 10 of a professional: Don't Follow, Lead:

- ❑ True Professionals aren't faint of heart
- ❑ Analyze the situation and willing to take new paths and try new solutions
- ❑ That's why they call it LEADERSHIP!

Applying Professionalism in Real Life:

Scenario #1

- ❑ You are the owner of a software engineering company. Your employees (engineers) want you to pay for them to attend training.
- ❑ How would you respond in a way that is legal, moral, and ethical?

Scenario #2:

- ❑ You are the owner of a software engineering company. Your employees (engineers) want you to let them do pro bono work for a local non-profit organization on company time.
- ❑ How would you respond in a way that is legal, moral, and ethical?

Scenario #3:

- ❑ You are a software engineer at a company where management routinely encourages you and your colleagues to use pirated software.
- ❑ How would you respond in a way that is legal, moral, and ethical?

(END)

Week 2 Topic: Professional Ethics & Code of Ethics

- **Law**:

Rules that mandate or prohibit certain behavior in society.

- **Moral Values:**

The fixed moral attitudes or customs of a particular group

- **Ethics:**

Define socially acceptable behaviors.

Code of Ethics:

- Established by various professional organizations
  - Produce a positive effect on judgment.
  - Establishes responsibility of professionals to act ethically according to the policies and procedures of their employers, professional organizations, and laws of society.
  - Organizations assume responsibility to develop, disseminate, and enforce policies.

Code of Ethics' Goals:

Provides an aid to individual decision making, presentation addresses nine different cases (with some overlap).

- Intellectual property
- Privacy
- Confidentiality
- Professional quality
- Fairness or discrimination
- Liability
- Software risks
- Conflicts of interest

- ❑ Unauthorized access to computer systems

IEEE Code of Ethics:

- ❑ IEEE Code of Ethics: Actions

1. PUBLIC - Software engineers shall act consistently with the public interest.

2. CLIENT AND EMPLOYER - Software engineers shall act in a manner that is in the best interests of their client and employer consistent with the public interest.

- ❑ IEEE Code of Ethics: Products

3. PRODUCT - Software engineers shall ensure that their products and related modifications meet the highest professional standards.

- ❑ IEEE Code of Ethics: Hierarchy

4. JUDGMENT - Software engineers shall maintain integrity and independence in their professional judgment.

5. MANAGEMENT - Software engineering managers and leaders shall subscribe to and promote an ethical approach to the management of software development and maintenance.

- ❑ IEEE Code of Ethics: Peers

6. PROFESSION - Software engineers shall advance the integrity and reputation of the profession consistent with the public interest.

7. COLLEAGUES - Software engineers shall be fair to and supportive of their colleagues.

- ❑ IEEE Code of Ethics: Self

8. SELF - Software engineers shall participate in lifelong learning regarding the practice of their profession and shall promote an ethical approach to the practice of the profession.

Principles of IEEE Code of Ethics:

- ❑ Act in public interest
- ❑ Act in interest of clients and employers
- ❑ Produce quality products
- ❑ Maintain independent judgment
- ❑ Manage ethically
- ❑ Protect integrity of profession
- ❑ Support colleagues

- ❑ Pursue lifelong learning

ACM Code of Ethics:

<u>General moral imperatives</u>: "As an ACM member I will…"

- ❑ Contribute to society and human well-being.
- ❑ Avoid harm to others.
- ❑ Be honest and trustworthy.
- ❑ Be fair and take action not to discriminate.
- ❑ Honor property rights including copyrights and patents.
- ❑ Give proper credit for intellectual property.
- ❑ Respect the privacy of others.
- ❑ Honor confidentiality.

<u>Specific professional responsibilities</u>: "As an ACM computing professional I will":

- ❑ Strive to achieve the highest quality, effectiveness and dignity in both the process and products of professional work.
- ❑ Acquire and maintain professional competence.
- ❑ Know and respect existing laws pertaining to professional work.
- ❑ Accept and provide appropriate professional review.
- ❑ Give comprehensive and thorough evaluations of computer system and their impacts, including analysis of possible risks.
- ❑ Honor contracts, agreements, and assigned responsibilities.
- ❑ Improve public understanding of computing and its consequences.
- ❑ Access computing and communication resources only when authorized to do so.

<u>Organization leadership imperatives</u>: "As an ACM member and an organizational leader, I will:"

- ❑ Articulate social responsibilities of members of an organizational unit and encourage full acceptance of those responsibilities.
- ❑ Manage personnel and resources to design and build information systems that enhance the quality of working life.
- ❑ Acknowledge and support proper and authorized uses of an organization's computing and communication resources.
- ❑ Ensure that users and those who will be affected by a design have their needs clearly articulated during the assessment and design of requirements; later the system must be validated to meet requirements.
- ❑ Articulate and support policies that protect the dignity of users and others affected by a computing system.
- ❑ Create opportunities for members of the organization to learn the principles and limitations of computer systems.

<u>Compliance with the Code</u>: "As an ACM member, I will:"

- ❑ Uphold and promote the principles of this Code.
- ❑ Treat violations of this code as inconsistent with membership in the ACM.

Ethical decision making: Case 1:

- ❑ **Ali is a database programmer**

  Large statistical program needed by his company.

  Company programmers are encouraged to publicize their work

- ❑ **Ali has found himself stuck on a problem**

  He has persisted at this for several months.

  His manager does not recognize complexity of problem.

  She insists job be completed in the few days.

- ❑ **Ali remembers:**

  Co-worker had given him source listings of their current work.

He also has an early version of commercial software developed at another company

- **Ali studies these programs**

  Sees two areas of code which could be directly incorporated into his own program

  He uses segments of code both from his coworker and from the commercial software

- He does not tell anyone or mention it in the documentation.
- He completes the project and turns it in a day ahead of time.
- How does the Code of Ethics help us understand this case?

Applying the code: Case 1:

- **This case highlights issues involving intellectual property**
- **Ali violated professional ethics in two areas:**

  1. Failure to give credit for another's work

  2. Using code from a commercial package that was copyrighted

- **If Ali only "looked" at co-worker's source code:**

  Could he then write his own program and still have an obligation to give credit?

- **Yes:** He should have acknowledged credit in documentation.
- **Use of commercial software code was also not appropriate:**

  Ali should have checked to determine whether or not company was authorized to use source code before using it.

- **In general:**

  Desirable to share and exchange intellectual materials

  But using software is definitely a violation of code.

Ethical decision making: Case 2:

- Aisha's company has been hired by a client to build a security system. Because of cost overruns, client has decided to opt for a less secure system.
- **Aisha believes information they will store is extremely sensitive.**
- **With weak security:**

Employees on workstations could figure out how to access this data.

Online intruders would also have access

- **Aisha feels strongly that system should be much more secure.**
- She has tried to explain the risk.
- **What should Aisha so? Should she refuse to build the system as they request?**

Applying the Code: Case 2:

- **This case highlights issues involving privacy.**
- **Company officials:**

Have an obligation to protect privacy of their employees. Therefore they should not accept inadequate security.

- **Aisha's first obligation:**

  Attempt to educate company officials

  If that fails, she needs to consider her contractual obligations in honoring assigned responsibilities.

- **We don't have Aisha's contract, but she may have to choose between her contract and her obligation to honor privacy and security.**

Ethical decision making: Case 3:

- **A contractor is determining requirements for an employment agency.**
- Client describes what is needed when displaying applications whose qualifications appear to match those for a particular job
- **Client also further states that names of white applicants are to be displayed ahead of nonwhites**

- **Further states that names of male applicants are to be displayed ahead of female applicants**

Applying the Code: Case 3:

- **This case highlights issues involving fairness and discrimination.** In this case, system designer is asked to build a system that, it appears
- Will be used to favor white males and discriminate against non-whites and females
- **From this is would appear that:**

  System designer should not do what he or she is told, plus

  Should also point out the problematic nature of what is being requested and ask client why this is being done

- **If client answers that they plan to use information to favor white males, then: Computer professional should refuse to build the system as proposed.**

Ethical decision making: Case 4:

- **A software development company has just produced a new software package.**
- It incorporates new tax laws and prepares both individual and small business tax returns
- **The president of the company knows that the program has a number of bugs**
- He also believes the first firm to put this kind of software on the market is likely to capture the largest market share.
- **The company widely advertises the package.**
- When the product is shipped, it includes a disclaimer of responsibility for errors resulting from the use of the program.
- The company expects it will receive a number of complaints, queries, and suggestions for modification. The company plans to use these to make changes and eventually issue updated, improved and debugged versions. The president argues that this is general industry policy:
- "Anyone who buys version 1.0 of a program knows this and will take proper precautions."
- Because of bugs, a number of users filed incorrect tax returns and were penalized by Rev Canada.

Applying the Code: Case 4:

- This case highlights issues involving legal liability for unreliable code. Software Company (and president in particular) violated several principles in the ACM code of ethics. Since he was aware of bugs in the product, he did not strive to achieve the highest quality.
- By failing to inform consumers about bugs to system, principle 2.5 was violated. Here the risks to users are so great they have to pay penalties for mistakes which result from the program.
- By law companies can make disclaimers only when they are in "good conscience" (Disclaimer does not meet legal test, violated principle 2.3)

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Week 3 Topic: The Structure of Organizations

Organization:

- Impossible to live in a civilized society without close contact with many large organizations
- Like schools, universities, public utilities, government and local government departments, the Health Service, commercial and industrial companies, and so on.
- In many ways, these organizations resemble each other.

Legal Form of An organization:

- **Law recognises individuals**
  - Enter into contracts
  - Tried for crimes
  - Sued
  - Act of Parliament impose duties on the individual etc
- **Incorporation**
  - Making into a body (*Corpus*)
  - Organization should be given a legal existence, through a process known as *incorporation.*

Incorporated Organisations:

- Incorporated
  - Royal Charters – IET, BCS, IMechE, RAeS
  - Acts of Parliament – Ceredigion County Council
  - Public or Private Companies (Companies Act 1985 and 1989)

Types of Commercial Organizations:

1. Sole Trader

Local Shop, Plumber

1. Partnership

Doctors, Lawyers, Accountants

1. Limited Company

Private or Public

Sole Trader:

- ❑ Individual
    - Sole person responsible for all debts
    - All assets including "private" at risk
    - Does NOT have to be the only employee

Partnership:

- ❑ Two or More People
- ❑ All at Risk. Similar to sole trader but >1 person
- ❑ Normally professionals
    - Doctors
    - Lawyers
    - Accountants
- ❑ Inflexible in Normal Commercial World
    - Movement of key Personnel
    - Too risky

Companies:

- Public or Private Companies
  - Public – Public Limited Company (PLC)
    - Trades shares to public
  - Private – Company Limited (Co Ltd)
    - Cannot sell shares to Public
    - Can sell shares privately
    - Limited by Shares
      - Commercial Companies
    - Limited by Guarantee
      - Charities, Professional Bodies
    - (Unlimited Companies)
    - Independent Existence
    - Divided
    - Shareholders
    - Or Members of the Company
    - Normally > 1 shareholder
    - 1992 Act allows single member

Company Constitution:

1. Share Capital
2. Company Constitution
3. Directors responsibilities

1. Share Capital:

- Shareholders (Subscribers) own Company
- At start of Company
  - Authorised share capital
    - Number & Nominal (par) Value
    - Say 100 shares @ £1
  - If debts > assets Shareholder lose shares

2. Company Constitution:

a. Memorandum of Association
   a. Controls External Relations
b. Articles of Association
   a. Control Internal Relations
c. Shareholders Agreement

a. Memorandum of Association:

- Company Name
  - Restrictions
- Country of Registration
  - England & Wales, Wales, Scotland
- Objects of Company
  - Companies Act 1989 allow general commercial company
- A Liability Clause
  - Liability of members is limited
- Authorised Share value
  - Nominal Share Value and Number

b. Articles of Association:

- ❑ Rules of Share capital
- ❑ Transfer of Shares
- ❑ Meetings of Members
- ❑ Rules Governing Directors' Appointments
- ❑ Power of Directors
- ❑ Dividends and Reserves

c. Shareholders Agreements:

- ❑ Protect interests of minor shareholders
- ❑ Article of Association
  - Changed at General Meeting
  - Needs 75% majority
- ❑ Agreement Between Shareholders
  - All must sign
  - Can govern way voting is done

3. Directors Responsibilities:

- ❑ Directors Elected by Shareholders
  - Act In best Interest of Company
  - Honest
  - Declare Interests
  - Aware of Company's Trading Position
  - Executive & Non-Executive Directors
- ❑ Company Secretary
  - Could be Director

Functional Units of an Organization:

Five groups of functions exist in almost any organization:

1. Production: Activities that directly contribute to creating the products or services that the company sells.
2. Quality management: Quality activities necessary to ensure that quality of the products and services produced is maintained at the agreed level.
3. Sales and Marketing: Sales is concerned directly with selling the product, while marketing is concerned with establishing the environment in which the product is sold (e.g. through advertising) and with deciding how the range of products sold by the company should develop.
4. Finance and Administration: To pay bills, to look after its funds, all central services.
5. Research and development:

   How can the company do better the things that it already

   Does and what other things might it profitably be doing?

Geographical organization:

An organization operates in more than one country.

The most obvious examples are in the field of food and drink.

Centralization v. decentralization:

- In a centralized organization, the detailed operational decisions are taken at the centre.
- In a decentralized organization, as many details as possible are settled at local level.

Management:

- Mangers of organization can project manager, production manager, general manager & Corporate manager.
- The goal of project managers is to produce systems which meet the users' needs, on time and within budget.
- Their main concerns are therefore planning, progress monitoring, acquisition and allocation of resources, and quality control.
- The tools of their trade are bar charts, activity networks, critical path analysis, and so on.
- Production Manager: Production management is concerned with productivity, efficiency and maintenance of quality.
- General Manager: General or corporate management deals with the management of the organization as a whole.
- Corporate Manager:

Corporate managers are responsible for the long-term strategy of the organization.

Monitor the overall performance of the organization and be prepared to handle serious problems which arise anywhere in the organization.

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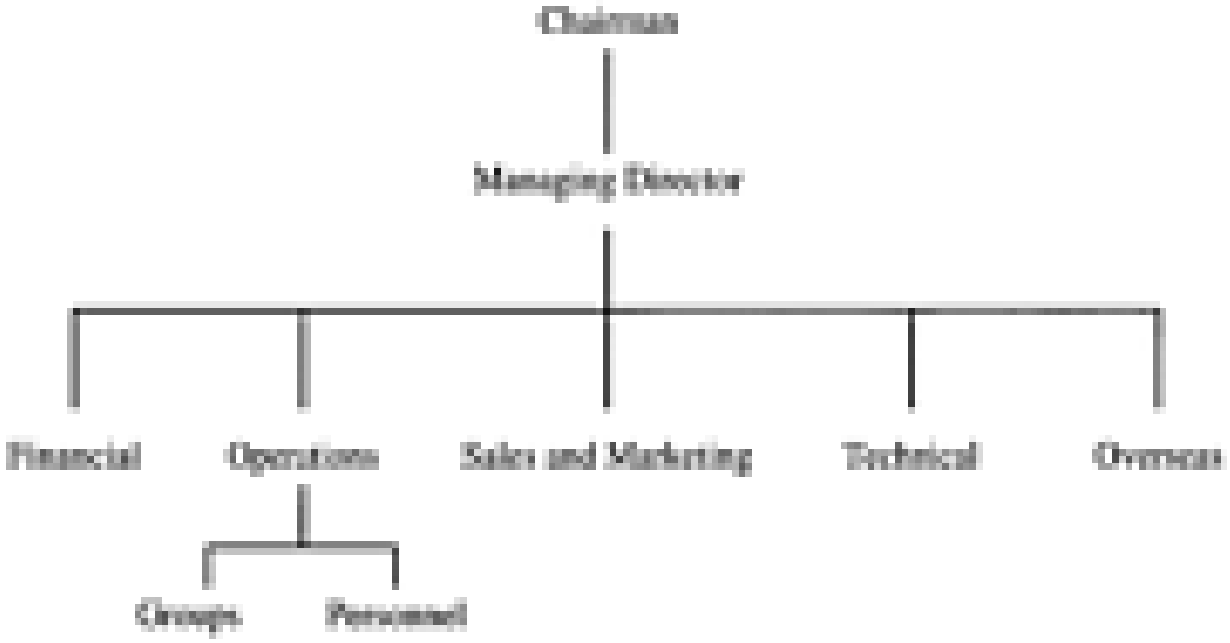
Week 4 Topic: Anatomy of Software House

Introduction (The Company):

- A Hypothetical company
- Syniad Software Ltd was founded some ten years ago by four friends.
- All four are members of the Board of Directors, along with two others who were recruited later.
- The company specializes in the production of bespoke software for clients who demand work of high quality.
- Syniad's head office is in London. Other offices are in Man-chester, Delft, Netherland.

Company Structure:



Operations Director:

- The Operations Director is responsible for all the revenue earning operations of the company.
- It is his job to ensure that all projects are completed satisfactorily
- And resources are available to carry out the projects that the company wins;
- The personnel reports to him.

Technical Director:

The Technical Director is responsible for:

- ❑ Quality management;
- ❑ Research and development;
- ❑ Marketing at a technical level (e.g. arranging for staff to give papers at conferences)
- ❑ Technical training (as opposed to training in, say, project management or presentational skills, which are the responsibility of the personnel function).

Syniad's Organizational Structure Type:

- ❑ Shows elements of all three of the types of organizational structure.

1. Functional division of responsibilities
2. Geographical element (represented by the director responsible for overseas operations)
3. Centralization and decentralization has little meaning (Centralized policies and procedures are widely used but they have usually been developed within one part of the company and have been adopted by general consent.

Centralized vs. Decentralized:

- ❑ In theory, staff have a sense of belonging to a group and regard their group manager as the manager who is permanently responsible for their career in the company.
- ❑ In practice, because projects often require expertise from more than one group, staff often find themselves working on projects for groups other than the one to which they belong.
- ❑ In a company of the size of Syniad, the distinction between centralization and decentralization has little meaning. Centralized policies and procedures are widely used but they have usually been developed within one part of the company and have been adopted by general consent.

Management of staff:

- ❑ New employees vs. Old employees…. <u>OUTSIDER</u>

<u>Staff Appraisals</u>:

- ❑ Employees' achievements and contributions to the company were properly recorded;
- ❑ Staff knew what was expected of them and what they needed to achieve in order to gain promotion;
- ❑ Proper plans for training and career development were made and regularly reviewed;
- ❑ Employees were aware of the company's opinion of their performance.

Producing the Budget:

- ❑ Staff in the company are broadly divided into

1. Technical or **Revenue earning** staff and
2. **Nonrevenue earning** staff

- ❑ Both require different capital to work.

Monitoring Financial Performance:

- ❑ Monitoring Syniad's performance against the budget should, in principle, be straightforward.
- ❑ Each month, the income and expenditure under the various heads are compared and, if significant deviations are observed, corrective action is taken.
- ❑ In practice, this simple procedure presents many difficulties.
- ❑ To monitor financial performance, company focuses on;

1. *Cost & Revenue*
2. *Project Costing*
3. *Sales*

1. **Costs and revenue:**
   - ❑ A major problem is caused by random fluctuations, themselves the product of many individual factors, for example:
   1. ***Annual Budget n Staff hiring***
   2. ***Large projects cause deviation in Budget***
   3. ***Fixed Price Project Estimation***

2. **Project costing:**
   - ❑ Because of these difficulties in monitoring the overall performance of the company, Syniad also tries to monitor the financial performance of individual projects, through a project costing system.
   - ❑ The costs and revenue of each project are calculated each month and the cumulative gross margin (i.e. the difference between total costs and total revenue to date on the project) calculated as a percentage of the total revenue.
   - ❑ In practice, this system does not work well.

3. Sales:

- ❑ The budgeted increase in revenue derives partly from increased charge rates, partly from better staff utilization and partly from an increased number of staff.
- ❑ All these factors are influenced by the forward sales position, that is by the staff required and the rates earned on the work to which the company is committed in the coming months.
- ❑ Two reports are used for assessing and monitoring the sales position.

1. The ***confirmed sales report*** shows, for each grade, the number of staff in that grade who are committed to contracts in each of the following twelve months and the total expected revenue from that grade in each month.
2. The ***sales prospects report*** shows, for each sales prospect, the potential value of the sale, its likelihood and the likely start date.

Long Term Planning:

- ❑ Strategic Planning for future
- ❑ The ability to plan strategically and to achieve strategic objectives is the hallmark of well run, successful companies.
- ❑ Strategic planning in Syniad has two related aspects.

  1. The first is to identify appropriate long-term goals

  2. Second is to identify and formulate plans to overcome those problems which are inhibiting it from attaining these goals.

- ❑ Expansion Plans
- ❑ Company Image
- ❑ Product mix (Fee based revenue vs. Package Software)
- ❑ Finance (under-capitalization)

Conclusions:

- ❑ Syniad, despite its problems, is a successful and well-managed company, however, they need to go multinational.
- ❑ Do directors have the expertise to manage this transition or to run the resulting company?(agreements for collaboration with comparable companies)
- ❑ Syniad has now reached a point where it can no longer thrive as a private company and its future must, inevitably, be very different from its past.

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Week 5 Topic: Organizational Financial Practices

Introduction:

- However good the quality of its products or services, no organization can be successful for any length of time unless its finances are soundly managed.
- Many young software engineers are attracted by the idea of starting their own company.

Need of Capital:

- A group of new or recent graduates in computing decide to set up their own company to provide software services and their intention is typically to offer contract hire services
- A client is unlikely to pay an invoice within less than one month of receiving it. Some large companies are notorious for not paying invoices for as much as six or even twelve months.
- There will be a need to have some money with which to start the venture.
- The group needs enough cash in hand to be able to live for at least three months. Additional money will be needed for the expenses of starting the company
- For large projects or packages, a much larger sum of money is likely to be needed while they are being developed because there will be no revenue coming into the company.

- For starting period cash will be needed for:
  - Salaries
  - rent rates, heating and lighting of the premises used
  - equipment and consumables
  - costs of advertising and marketing the products
  - miscellaneous expenses, ranging from company stationery to travelling expenses
- How does one set about raising this money? The first step is to produce a ***business plan***.
- It typically contains:
  - a description of what the company will be doing, together with information to show that it is technically feasible and that founders of the company have the necessary expertise
  - an assessment of the size of the market and the competition
  - a prediction of the financial performance of the company

Sources of funds:

- They can be grouped into:
  - Grants
  - Loans
  - Sale of Equity

Grants:

- A *grant* is a sum of money given to the company; while the company is obliged to demonstrate that it has been used for the purposes for which it was intended, it is not intended that the grant should ever be paid back to the organization which gave it
- The availability of grants and other help for new companies depends very much on where the company is located, how many people it expects to employ, and on government policy at the time.

Loans:

- A loan is a sum of money lent to the company; interest is payable on it, at a rate that may be fixed or variable, and the loan is usually for a fixed period
- The company is liable to pay back the loan and, if the company goes into liquidation, the lender is entitled to recover the loan from the sale of the assets of the company.
- In most cases, security is required for the loan

Sale of Equity:

- *Equity capital* is money paid to the company in exchange for a share in the ownership of the company
- Shareholders are at a much greater risk of getting a poor return on their capital or even losing it completely than are lenders but, in compensation for this, they stand to make a greater profit than lenders if all goes well

Budgeting & Monitoring:

- A budget is a prediction of the future financial position of an organization covering , usually, the current or the next financial year
- The ordinary manager in a company is, however, much more concerned with budgeting for income and expenditure
- Budgeting is an iterative process
- The first version of the budget is likely to show expenditure exceeding income, since the operating managers will want to expand their operations while the sales and marketing department will not wish to give hostages to fortune by being over-optimistic about the volume of sales it can generate. Adjustments will have to be made repeatedly until a situation is reached in which budgeted sales exceed budgeted expenditure with a reasonable profit margin; the operational managers are happy that they can service the predicted volume of sales with the budgeted staff levels; and the salesmen are confident that they can produce the predicted sales

Working Capital & Cash Flow:

- It is perfectly possible for a company to be consistently profitable and yet be unable to pay its bills
- Accounting normally operates on an *accrual* basis
- The value of *work in progress*
- It is usual to negotiate stage payments rather than leaving all payment until the work is completed.
- Cash has therefore to be found to cover the gap between what a company has to pay out in cash and what it receives in cash—working capital
- A document “cash flow prediction” is the amount of cash expected to be received and disbursed in each of the next twelve months
- The bank specifies the maximum that can be borrowed on an overdraft but interest is only payable on the amount actually owed

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Week 5 Topic: Human Resource Management

Introduction:

- It is a function in organizations designed to maximize employee performance in service of an employer's strategic objectives
- Management of people, staff training and development with a strategic approach suggest that human resource management is particularly appropriate for software work

A model of human resource management:

- A corresponding commitment to the organization is expected from employees. They are therefore autonomous in the sense of, to some degree, managing themselves.
- Human resource management is the responsibility of all managers
- Maximum utilization of human resources available to the enterprise.

1-Long-term, strategic and proactive in style:

- The problems associated with personnel in an information technology environment require a disciplined approach to establishing numbers of staff; the utilization of personnel; the development and education of employees, together with the construction of comprehensive human resource management policies that are not only responsive to immediate needs but also are building blocks for the medium- and long-term corporate requirements

2-Commitment to the organization:

- The real challenge is to shift employee attitudes from mere compliance with rules at work to commitment and self-motivation
- This signifies a commitment to staff development as part of the "learning organization" and firm-specific skills that are less transferable between firms. Skills include attendance, flexibility, responsibility, discipline, identification with the company and, crucially, work-rate.

3-Self-management:

- Team working is a vital element
- Direct and regular face-to-face contact between managers and workers is emphasized. This builds trust and helps maintain motivation
- The trick is to reconcile motivating individuals with team-building because it is teams, not individuals, who complete projects. Performance appraisal is central in HRM strategies

4-Unitary perspective:

- The entire enterprise is regarded as analogous to a team with one focus of loyalty and one focus of authority
- A crucial part of keeping effective workers content is a system where they can be promoted without having to become managers
- At Microsoft a talented software developer can stay just that and yet rise to the top tier of elite "architects". These architects are not company directors despite their seniority.

5-Maximum utilization of human resources:

- It's a difficult task specially in information technology environment.
- It is the possibility of computer surveillance of work rate that allows decision makers to look more critically now than ever before at work output in offices
- Management gets the impression that the project is going well and has no idea what's actually happening at the grass roots level. By the time they find out, it's too late

Training and human resource management:

- Despite universities establishing more IT and computing courses and applications rising strongly, the industry continues to generate more vacancies than capable recruits
- Computing companies find that IT graduates often lack transferable or "people-handling" skills, such as communications and a broader knowledge of how businesses work.
- Dr. Neil Barrett, senior fellow at Bull, reckoned that "from an industry point of view, we are often better placed to take people with good generalist degrees and turn them into engineers"
- Computer scientists are people who understand the finer details of software programming but cannot program. We have to start again and teach them the methods and tricks we work with.

Health and Safety at Work:

- Health and safety at work usually only hits the headlines when there is a major disaster
- In many high risk areas, the safety systems themselves are often computer controlled
- Around 200 employees each year still die as a result of accidents at work

Health and Safety Act 1974:

- *1. Premises,* i.e. factory, office etc.
- ***1. Employment* is the only necessary criterion.**
- 2. *Specific* requirements
- **2. *General* (and far-reaching) requirements**
- 3. No requirements on manufacturers or suppliers
- **3. Creates comprehensive new duties for manufacturers and suppliers of articles and substances for use at work**
- 4. Regulations for specific industries and processes: rigorous but difficult to keep up to date in the face of rapidly changing
  technology.
- **4. Specific regulations but couched in general terms and supplemented by approved codes of practice that are more easily updated.**

(END)

Week 7 Topic: Intellectual Property Rights

Introduction:

- Intellectual property rights are often the most valuable assets owned, used and developed by a software house.
- Intellectual property rights include:
    - Confidential information
    - Patents
    - trade marks
    - Designs
    - Copyrights protecting computer programs
- They protect information stored by electronic means and all of the paperwork which accompanies a program, such as the user manual, plus any multimedia packages and most items on the Web.
- Great care should be taken to protect, exploit and enforce intellectual property
- The name under which a product is sold may be registered as a trade mark
- the hardware or a process used in its manufacture may be protected by a patent
- the look of the product may be registered in the Designs Registry
- software can be protected by copyright
- the know-how which goes into the development of the product may be protected as confidential information
- Unauthorized use of intellectual property can be stopped by injunction and damages may be sought for infringement of these rights
- The law is constantly changing with technological advance
- General Agreement on Tariffs and Trade (GATT) concerned the protection of intellectual property rights in the face of widespread piracy of software products

Confidential Information:

- Information "which is not public property and public knowledge"
- Any category of information, from personal confidences, to trade secrets and sensitive government information, any or all of which a computer scientist might handle in the course of his or her work, or all or any of which a firm may want to protect against unauthorized use or disclosure by others
- Information will be protected only if it is confidential. Non-confidential information, unless protected, e.g. by copyright or a patent is deemed to be in the public domain and can be used by anyone.
- Three conditions must be satisfied before an action for breach of confidence can succeed:
    - the information must be confidential
    - the information must have been disclosed in circumstances which give rise to an obligation of confidence
    - there must be an actual or anticipated unauthorized use or disclosure of the information

Patents:

- A government authority conferring a right or title for a set period, especially the sole right to exclude others from making, using, or selling an invention
- A patent gives to an inventor a monopoly in an invention. This means that the inventor is given the exclusive right to use or exploit the invention for a defined period
- The monopoly granted by patent law is so strong, that the owner of a patent may even exclude independent inventors from the market
- The better the patent and the more commercially desirable the breakthrough, the more likely it is to be challenged. For example, if competitors can produce a similar product or process, which is not covered by the patent, they will be free to market it and to erode the commercial advantage of the patentee. If they can prove that the subject matter of the patent has been used or disclosed before, they can invalidate the patent
- Patent Act merely sets out a number of criteria which must be satisfied before an invention can be patented
- a patent may only be granted if:
    - the invention is new
    - it involves an inventive step
    - it is capable of industrial application
    - the subject matter of the invention does not fall within an excluded class

- It is possible to patent something which is more than just a program—something which can be called, for simplicity, a “program plus”
- A computer program is not excluded from patentability if it produced, or is capable of producing, a further technical effect beyond the normal physical interaction between software and hardware, i.e. it is potentially patentable if it makes something else do something.

Copyright:

- The exclusive legal right, given to an originator or an assignee to print, publish, perform material, and to authorize others to do the same
- Copyright protects more items generated by businesses or by individuals than any other aspect of intellectual property law
- It can protect business letters, manuals, diagrams, computer programs
- Copyright owners face the specter of unlimited piracy through uncontrolled copying with the advent of internet
- What we will probably see over the next few years are stronger laws, more rights for copyright owners, widespread licensing schemes and greater use of technical anti-piracy or copy-monitoring devices and electronic rights management systems
- Copyright law gives six exclusive rights to the owner of copyright:
- copy the work
- issue copies to the public
    - rent or lend the work to the public
    - perform, play or show the work in public
    - broadcast the work or include it in a cable programmed service
    - make an adaptation of the work or to do any of the above with an adaptation
- The rights apply equally to published and to unpublished works

Acts permitted in relation to copyright:

- Some acts are permitted under the 1988 Act, even though they would otherwise amount to breach of copyright.
    - Fair dealing
    - Making back-up copies of computer programs
    - Transfers of works in electronic form
    - De-compilation for the purpose of interoperability
    - Error correction
    - Databases

Remedies for breach of copyright:

- A copyright owner has all the usual civil remedies of search, injunction, damages and an action for an account of profits made in breach of copyright
- If it is shown that at the time of the infringement of copyright the defendant did not know and had no reason to believe that
  copyright subsisted in the work, then the plaintiff is not entitled to damages against the defendant
- A copyright owner is also given an important power to enter premises without using force in order to seize infringing copies, or articles specifically designed or adapted for making copies

Plagiarism:

- The practice of taking someone else's work or ideas and passing them off as one's own.
- All of the following are considered plagiarism:
    - turning in someone else's work as your own
    - copying words or ideas from someone else without giving credit
    - failing to put a quotation in quotation marks
    - giving incorrect information about the source of a quotation
    - changing words but copying the sentence structure of a source without giving credit
    - for a computer program changing variable names only, or not changing the structure or flow of a program

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Week: 8 Computer Contracts

Introduction:

- An agreement between two or more parties for the doing or not doing of something specified
- Contracts serve the following purpose:
  - Set out the agreement between the parties
  - Set out the aims of the parties
  - Provide for matter arising while the contract is running
  - Ways of terminating the contract and the consequences
- If the contracts are too harsh or unfair causing any issue between parties to be unresolved, it is the responsibility of contract laws to contemplate according to the rules
- There are almost never disputes over contracts which run perfectly. Example marriage.
- Example of a ship carrying a cargo.
- In order to avoid disputes and future difficulties it is better to draft a document which sets out:
  - The terms on which both parties is to work
  - Methods of payments
  - Appropriate ways to terminate the contract-notice required
- Contract should be clear, concise and consistent. There should be no ambiguity and the parties to the agreement should be left in no doubt as to their rights and duties. Ambiguity and doubts can lead to performance which is viewed as unsatisfactory. This can lead to disagreement and the expenditure of time, effort and therefore money, in resolving the matter.

Contracts for the supply of custom-built software at a fixed price:

- Software suppliers try to use what are known as standard form contracts, which are used or intended to be used many times over.
- Such a contract might consist of:
  - a short introductory section
  - a set of standard terms and conditions
  - a set of appendices or annexes

Introductory Section:

- ❑ It states that it is an agreement between the parties whose names and registered addresses are given.
- ❑ It is dated and signed by authorized representatives of the parties.
- ❑ It often begins with a set of definitions of terms used in the course of the agreement, set out either in alphabetical order, like a dictionary, or in the order in which they appear in the rest of the contract –The Company, The Client

Other parts:

- ❑ Terms and conditions
- ❑ Annexes must include any document stated like SRS. This is to avoid, for example, the situation in which statements made by an over-enthusiastic salesman while trying to win the business are claimed by the client to constitute part of the contract

Issues dealt with Standard Terms & Conditions:

- ❑ What is to be produced?
- ❑ What is to be delivered?
- ❑ Ownership of rights
- ❑ Payment terms
- ❑ Calculating payments for delays and changes
- ❑ Penalty clauses
- ❑ Obligations of the client
- ❑ Standards and methods of working
- ❑ Progress meetings
- ❑ Project Managers
- ❑ Acceptance procedure
- ❑ Warranty and maintenance
- ❑ Termination of the contract

Other types of software services contract:

- There are four types of contractual arrangement which are widely used in connection with the provision of software services:
  - fixed price
  - contract hire
  - time and materials
  - consultancy

Contract Hire:

- The supplier agrees to provide the services of one or more staff to work for the client
- The staff work under the direction of the client
- Supplier's responsibility is limited to provide suitable competent people and replacing them if they become unavailable or said unsuitable by the client
- Payment is on the basis of a fixed rate for each man day worked
- Issues such as delay payments, acceptance tests and many others simply do not arise

Time and Materials:

- It is somewhere between a contract hire agreement and a fixed price contract.
- The supplier agrees to undertake the development of the software in much the same way as in a fixed price contract but payment is made on the basis of the costs incurred, with labor charged in the same way as for contract hire
- The supplier is not committed to completing the work for a fixed price, although a maximum payment may be fixed beyond which the project may be reviewed

Consultancy contracts:

- Consultants are typically used to assess some aspect of an organization and to make proposals for improvements.
- The end product of a consultancy project is therefore usually a report or other document.
- Consultancy projects are usually undertaken for a fixed price but the form of contract is very much simpler

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