

Lecture 1 & 2

. Types of Rights:

- **Negative Rights:**

- **Definition:** Rights requiring others to refrain from interfering with your freedom.
- **Example:**
 - **Right to Personal Security:** If someone attacks you on the street, they violate your negative right to be safe. Laws against assault protect this right.
 - **Right to Privacy:** If someone unauthorized accesses your personal emails, they violate your right to privacy.

- **Positive Rights:**

- **Definition:** Rights imposing a duty on others to assist or support the right-holder.
- **Example:**
 - **Right to Education:** Society has a responsibility to provide access to education for all children. For instance, public schools must offer free education.
 - **Right to Healthcare:** If someone is seriously ill, hospitals have an obligation to provide medical care, which may be guaranteed by law in many countries.

2. Legal vs. Moral Rights:

- **Legal Rights:**

- **Definition:** Rights codified in law, enforceable by penalties.
- **Example:**
 - **Anti-Discrimination Laws:** If a company refuses to hire someone solely based on their gender, they can face legal action under employment discrimination laws.

- **Moral Rights:**

- **Definition:** Rights based on societal norms, which may lack legal enforcement.
 - **Example:**
 - **Helping Others:** If you see an elderly person struggling to cross the street, the moral expectation is to assist them. While there's no law requiring you to help, not doing so could lead to social disapproval.
- **Moral status** leads to let you decide on the base of good or bad consciousness, religious training, manners etc. Although it does not involve penalty in violating such rights but a feeling of guilt is always there too follow.
- **Legal status** enforces your deeds on the grounds of defined law and has a penalty or punishment for those violating such rights or laws.

3. Case Studies for Comparison:

- **Polluting the Environment:**

- **Moral Example:** If you see someone throwing trash on the ground, you might remind them not to litter because it harms local wildlife and ecosystems.
- **Legal Example:** Many cities have laws that fine individuals \$200 for littering, deterring pollution through legal penalties.

- **Elderly Seats in a Bus:**

- **Moral Example:** When a bus is crowded, it's a common expectation for younger passengers to offer their seats to elderly individuals for their comfort and safety.
- **Legal Example:** In some cities, there are specific seats marked for the elderly, and failure to give up such a seat when requested can result in a \$50 fine.

- **Password privacy in an organization**

- **Moral status:** No one is supposed to share their password else their data can be tampered, stolen etc..
- **Legal status:** If any one leaks his/her password he/she should pay a fine and suspended for a day.

4. Employment Law Overview for IT Professionals:

- **Key Issues:**

- **Discrimination:** A software company cannot refuse to hire a qualified candidate simply because of their age, as it violates equal opportunity laws.
- **Data Privacy:** IT professionals must ensure that client data is kept secure, as breaches can lead to legal consequences under data protection laws.
- **Intellectual Property Rights:** If a developer creates a unique application while employed, the company may own the rights to that application, depending on the employment contract.
- **Whistleblower Protections:** If an IT worker reports unethical data practices within their company, they are protected from retaliation, such as wrongful termination.

5. If Your Rights Are Violated:

- **Document the violation:** Keep detailed records, like emails or messages, showing what happened and any relevant dates.

- **Review contracts and policies:** Check your employment agreement for clauses on discrimination or harassment.
- **Report internally:** Bring the issue to your manager or HR, providing them with the evidence you've collected.
- **Seek legal counsel or file a complaint:** If the issue isn't resolved internally, consider talking to a lawyer or filing a complaint with a labor board or equal opportunity agency.

Lecture 3 & 4

Profession vs. Occupation:

1. Definitions:

- **Profession:**
 - Involves specialized knowledge, extensive training, and adherence to a code of ethics.
 - **Example:** Doctors and lawyers require years of education, training, and must follow strict ethical guidelines in their practice.
- **Occupation:**
 - Requires fewer qualifications and does not typically involve specialized knowledge.
 - **Example:** A cashier or retail associate may not need formal education or specialized training to perform their job.

2. Key Differences:

- **Autonomy:**
 - **Professionals** often work independently and have the freedom to make decisions (e.g., a surgeon deciding on the best approach for an operation).
 - **Occupations** generally involve more supervision and less independence (e.g., an assembly line worker follows strict instructions).
- **Responsibility:**
 - Professionals carry significant responsibility for their work's outcome (e.g., lawyers ensuring fair representation).
 - Occupations may have less personal accountability (e.g., a data entry clerk's errors may be corrected by a supervisor).
- **Ethical Codes:**
 - Professionals adhere to established ethical guidelines (e.g., a teacher following a code of conduct regarding student interactions).
 - Occupations may not have formal ethical codes, relying instead on general workplace policies.

3. Characteristics of a Profession:

- **Esoteric Knowledge:**
 - Professionals master a specialized body of knowledge.
 - **Example:** Engineers must understand complex principles of physics and mathematics to design safe structures.
- **Autonomy:**
 - Professionals set their own standards of practice.
 - **Example:** An architect has the freedom to choose design elements based on client needs and safety regulations.
- **Formal Organization:**
 - Many professions are regulated by organizations controlling standards and licensing.
 - **Example:** The American Medical Association regulates doctors and sets standards for medical practice.
- **Code of Ethics:**
 - Professionals follow ethical guidelines and often take formal oaths.
 - **Example:** Nurses take an oath to prioritize patient welfare and confidentiality.
- **Social Function:**
 - Professions contribute significantly to society.
 - **Example:** Lawyers advocate for justice, while teachers educate the next generation.

4. Professional Bodies:

- **Definition:** Organizations that regulate professions, set codes of conduct, and oversee disciplinary actions.
- **Functions:**
 - Set educational standards for entry into the profession (e.g., the Bar Association for lawyers).
 - Provide guidance to governments on regulatory issues.

5. Reservation of Title and Function:

An example where both reservation of title and reservation of function apply is veterinary surgery. Under the Veterinary Surgeons Act 1966, you are not allowed to call yourself a veterinary surgeon unless you are registered with the Royal College of Veterinary Surgeons (RCVS); in order to be registered, you must have the proper qualifications. And, subject

to certain limitations, it is a criminal offence to carry out surgical procedures on animals unless you are registered with the RCVS

- **Reservation of Title:**

- Only qualified individuals can use specific professional titles.
- **Example:** Only licensed doctors can call themselves "physicians."

- **Function:**

- Certain activities are restricted to those with appropriate qualifications.
- **Example:** Only licensed architects can sign off on building plans.

6. Is Computing a Profession?

- **Mastery of Knowledge:**

- Computing professionals possess specialized skills, though the field is diverse.
- **Example:** A cybersecurity expert has in-depth knowledge of network security protocols.

- **Autonomy:**

- Autonomy varies by role; there is no single governing body for all computing professionals.
- **Example:** A freelance software developer has significant independence compared to a developer working in a corporate environment.

- **Social Contribution:**

- Computing professionals support various societal functions.
- **Example:** Programmers develop software that enhances communication and efficiency in businesses.

7. Software Engineering:

- Recognized as a distinct professional field within computing, requiring unique qualifications and standards.
- **Example:** In Texas, software engineers can obtain licenses, similar to traditional engineers.

8. Engineering and Software Development:

- Software development shares traits with traditional engineering, including design constraints like functionality, performance, and budget.
- **Example:** A software engineer must ensure that an application meets user requirements while remaining within budget and timeline constraints.
- In some countries, the title of "engineer" and related tasks are legally restricted to those with specific qualifications (e.g., licensed civil engineers must oversee construction projects).

Lecture 5

Washington Accord and Related Agreements

- **Washington Accord (1989):**

- **Purpose:** Ensures that engineering qualifications (typically 4-year programs) in signatory countries are substantially equivalent.
- **Significance:** Graduates from accredited programs in one country are recognized as professionals in other member countries, enhancing mobility.

- **Sydney Accord (2001):**

- **Scope:** Focuses on recognizing engineering technology qualifications, typically 3-year programs.
- **Relevance:** While not as high-level as the Washington Accord, it ensures that technologists can work internationally.

- **Dublin Accord (2002):**

- **Focus:** Deals with technician engineering programs, usually of 2-year duration.
- **Implication:** Encourages mutual recognition of technician qualifications, promoting skilled labor mobility.

Professional Bodies in Computing

- **1946 - IEEE (Institute of Electrical and Electronic Engineers):**

- One of the oldest and largest professional organizations.
- **IEEE-CS (Computer Society)** is a key part of the IEEE, providing resources like conferences, publications, and certifications for computing professionals.

- **1947 - ACM (Association for Computing Machinery):**

- Pioneered the creation of influential conferences, journals, and resources like the ACM Digital Library.
- Strong focus on advancing computing as a science and profession.

- **1957 - BCS (British Computer Society):**

- Started as a standard professional body in the UK.
- Became the **Chartered Institute of IT** in 2009, focusing on promoting high professional standards, education, and networking for IT professionals globally.

- **Other notable bodies:**

- **IEE (Institution of Electrical Engineers, 1871):** With over 130,000 members, focuses on electrical engineering but has significant overlap with computing disciplines.

- **Computer Society of India (1965)**: Played a major role in the growth of IT professionals in India.
- **German Informatics Society (1969)**: Focuses on promoting computer science and technology innovation in Germany.

Code of Conduct (BCS)

Key Sections:

1. **The Public Interest**:
 - IT professionals should prioritize public health, safety, and privacy.
 - They should avoid bias and promote **equal access** to IT for all, helping bridge the digital divide.
 - Emphasis on ensuring the **security and wellbeing** of systems used by the public.
2. **Duty to the Relevant Authority**:
 - **Confidentiality**: Don't disclose private or sensitive information without proper consent.
 - **Conflicts of interest**: Avoid personal or financial conflicts that might compromise professional judgment.
 - Example: When working on a project for a client, IT professionals must not misuse their knowledge for personal gain.
3. **Duty to the Profession**:
 - **Professional standards**: Act in ways that reflect positively on the IT profession.
 - **Support**: Engage in activities that promote the profession, such as mentoring, sharing knowledge, or participating in professional development initiatives.
4. **Professional Competence and Integrity**:
 - **Competence**: Only undertake tasks for which you are properly qualified.
 - **Continuous learning**: Keep updating your knowledge, especially in a fast-evolving field like IT.
 - **Ethical integrity**: Reject bribery, and avoid making misleading or exaggerated claims about your qualifications or capabilities.
 - Example: Professionals must respect intellectual property laws and avoid actions like plagiarism.

Lecture 6

BCS and Education

- **Professional Examinations**:
 - Introduced in **1973** to recognize professional skills, with three stages: **Certificate, Diploma, and Professional Graduate Diploma**.
- **Accreditation and Exemption**:
 - Accredited courses meet educational requirements, and may qualify students for exemptions from higher education qualifications.
 - Students on accredited courses can achieve professional membership after relevant experience and training.
- **Short Courses**:
 - BCS offers a wide range of qualifications through short courses tailored for industry professionals.

Continuing Professional Development (CPD)

- **Definition**: CPD is the systematic maintenance and improvement of knowledge and skills throughout a professional's career.
- **BCS Services**:
 - Provides CPD services to individual members and industries, such as **career development** and keeping members updated on the latest in computing.

Advancement of Knowledge

- **The Computer Journal**:
 - First published in **1958**, it's a significant publication in computing, with six issues annually, showcasing cutting-edge research.

BCS Membership Grades

- **Affiliate**: Open to anyone with an interest in computing.
- **Companion**: For members of other professional bodies with at least 5 years of IT experience.
- **Student**: For individuals pursuing IT qualifications.
- **Associate**: For those with less than 5 years of experience or holding non-accredited degrees.
- **Membership (Professional Grade)**: Requires a BCS Professional Graduate Diploma, an honors degree, or 5 years of IT experience.
- **Fellow (Senior Grade)**: For IT professionals with at least 5 years of senior experience in the field.
- **Chartered Professional Grades**: Members or Fellows holding the BCS Professional Graduate Diploma and relevant professional experience can apply for this esteemed status.

Lecture 7

What is an Organization?

- **Definition:** A group of people working together in a formal way with legal existence.
- **Examples:**
 - **Schools and Colleges:** Teachers, administration, and support staff work together.
 - **Hospitals:** Doctors, nurses, and staff collaborate to provide healthcare services.
 - **Banks:** Financial advisors, managers, and tellers organize to manage financial services.
 - **Private Company:** E.g., a local bakery run by one or more individuals.
 - **Government Department:** E.g., the postal service where employees provide public services.
- **Key Concept:** Organizations operate with a formal structure, which separates them from informal groups. Even a jail can be seen as an organization where officers and administrators have specific roles.

Extra Thought:

- A sports team could be considered an organization if formally registered (e.g., a football club).

Commercial Organizations

- **Definition:** Groups formed with the purpose of making a profit by pooling skills and resources.
- **Examples:**
 - **Apple Inc.:** Technology company driven by profit.
 - **Starbucks:** A commercial coffee chain where various individuals work toward profit goals.

Sole Trader

- **Definition:** An unincorporated business owned and managed by one person.
- **Examples:**
 - **Local freelance designer:** They manage projects, clients, and profits alone.
 - **Independent shopkeeper:** Runs a small retail store without any formal partners.
- **Advantages:**
 - Full control and simple to set up.
 - Flexibility in decision-making.
- **Disadvantages:**
 - **Unlimited Liability:** Personal assets like a family home are at risk if debts are incurred.
 - **Example:** If a freelance web designer is sued by a client for breach of contract, their personal savings could be used to cover legal damages.

Extra Tip:

- For sole traders, keep in mind that they often operate small businesses that rely heavily on personal effort.

Partnership

- **Definition:** A business owned by two or more individuals with shared responsibility.
- **Examples:**
 - **Law firms:** Many operate as partnerships, with several lawyers sharing ownership and profits.
 - **Medical practices:** Some private clinics are run by doctors who form a partnership.
- **Key Issue:** Partners share liability and profits.
 - **Example:** Two accountants form a partnership to handle clients' finances. They both contribute, but if one partner mishandles a client's account, both are legally responsible.

Real-life Example:

- **Ben & Jerry's** started as a partnership between Ben Cohen and Jerry Greenfield before growing into a major corporation.

Cooperatives

- **Definition:** A member-owned business with at least five shareholders where all members have equal voting rights.
- **Examples:**
 - **Agricultural cooperatives:** Farmers pool their resources to buy equipment and sell products (e.g., dairy cooperatives like **Amul** in India).
 - **Credit unions:** Member-owned financial cooperatives providing banking services.
- **Advantages:**
 - Equal say in decision-making regardless of investment.
 - Limited responsibility for debts unless reckless.
- **Disadvantages:**
 - Hard to attract members focused solely on financial gain.

- **Example:** A food cooperative where members manage the store together. Even if one member invests more time or money, they still get only one vote, which might discourage some investors.

Extra Tip:

- Cooperatives are especially popular in rural or underdeveloped areas where community support is essential.
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Limited Companies

- **Definition:** A separate legal entity owned by shareholders.
- **Examples:**
 - **Private Limited Company:** A small business like a family-owned construction firm.
 - **Public Limited Company (PLC):** Large corporations like **Coca-Cola** or **BP**, which issue shares to the public.
- **Key Concepts:**
 - **Corporate Identity:** The company is treated as its own "person" under the law.
 - **Limited Liability:** Shareholders can only lose what they've invested.
 - **Example:** If a PLC goes bankrupt, the shareholders' personal wealth remains protected, except for their shareholding.

Memorandum of Association:

- Lists details like the company's name, registered office, objectives, and share structure.
- **Example:** If a startup registers as a limited company, it needs a memorandum outlining its goals (e.g., developing a new app).

Directors:

- Have a duty to act in the best interest of the company and shareholders.
 - **Example:** A director in a software company might be held accountable if they purchase equipment unsuitable for the company's needs.
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Non-Commercial Bodies

- **Definition:** Organizations that operate without the goal of profit, usually focusing on charitable, educational, or social goals.
- **Examples:**
 - **Red Cross:** A global humanitarian organization.
 - **UNICEF:** Focuses on children's welfare.
 - **Community centers:** Often run as non-commercial entities to support local activities.
- **Key Points:**
 - Staff typically work for low pay or as volunteers.
 - The primary focus is on service rather than revenue generation.

Setting Up a Company

- **Steps:**
 1. Agree on a business goal.
 2. Register the company legally (involve lawyers and accountants if needed).
 3. Optionally buy an "off-the-shelf" company.
 - **Example:** A group of friends who want to start a digital marketing agency would first decide on financial contributions, register the business as a limited company, and start operations.
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Paying Taxes

- **Sole Traders:** Pay taxes on all profits reported in personal tax returns.
 - **Example:** A freelance photographer declares both income and business expenses when filing their taxes.
- **Partners:** Report their share of the partnership's income on personal tax returns.
 - **Example:** Two restaurant owners split the profits and report them individually to tax authorities.

Final Tips for Open-Book Exam:

1. **Use Real-life Examples:** Having practical examples at hand can help clarify key points during the exam.
2. **Compare Business Types:** Know the pros and cons of sole traders, partnerships, and limited companies.
3. **Memorandum Details:** Familiarize yourself with the memorandum of association in the context of limited companies.

Lecture 8

Introduction

- New IT graduates often aim to set up their own companies, rather than working for others. This lecture focuses on the steps and challenges involved in starting a business.

Why Capital is Needed

- **Capital** is essential for purchasing equipment, paying for staff salaries, and other operational costs while building products or services.
- Expenses include:
 - **Salaries** for founders and staff.
 - **Rent, utilities, advertising, and marketing.**
 - **Miscellaneous expenses**, including travel and stationery.

The Business Plan

- A **business plan** is crucial to securing funding. It outlines the business idea, market potential, competition, and financial projections.
- **Contents of a Business Plan:**
 - Description of the business and its technical feasibility.
 - Market size, competition analysis.
 - Financial projections, including budgets and profit/loss accounts.

Sources of Finance

- **Bootstrapping:** Using personal savings or funds from friends/family.
- **Angel Investors:** Wealthy individuals investing in early-stage startups.
- **Venture Capital:** Firms that invest in high-growth potential startups.
- **Crowdfunding:** Raising funds from a large number of people online.
- **Grants:** Financial assistance from government or non-profits that don't need to be repaid.
- **Loans:** Borrowing money that must be repaid with interest.

Types of Finance

1. **Grants:**
 - Given by governments or charities, intended for capital investments.
 - Don't need repayment but come with strict usage conditions.
2. **Loans:**
 - Money borrowed with a fixed interest rate and repayment schedule.
 - Lenders can claim company assets if loans aren't repaid.
3. **Equity Capital:**
 - Money in exchange for ownership shares in the company.
 - Provided by **business angels** or **venture capitalists**.

Gearing (Leverage)

- **Gearing** refers to the relationship between loan capital and equity capital.
- **Lenders** are at less risk compared to **shareholders**, who may lose their investment but can gain significantly if the business succeeds.

Key Takeaways for Startups

- **Planning:** Developing a robust business plan is crucial for attracting investors and ensuring realistic goals.
- **Financing:** Understanding different sources of capital—loans, grants, and equity—helps founders make informed decisions on funding their ventures.
- **Gearing:** Managing the balance between equity and debt is essential for sustainable growth.

Lecture 9

Financial Accounting Overview

- **Key Components of the Annual Report:**
 1. **Balance Sheet** – Shows what the company owns (assets) and what it owes (liabilities).
 2. **Profit and Loss Account** – Displays the money received and spent over a given period (usually one financial year).
 3. **Cash Flow Statement** – Demonstrates the movement of cash in and out of the company, linking the balance sheet and profit and loss account.

Together, these financial statements provide a complete picture of the business's financial health.

Annual Report

- **Purpose:** Provides details about the company's activities and financial performance during the preceding year.

- **Example:** In the UK, companies are required to submit this report to Companies House, while in Pakistan, it must be filed with the **SECP (Securities and Exchange Commission of Pakistan)**.

Extra Tip:

- Annual reports are a way for stakeholders to assess how well a company is performing and where improvements might be needed.

Balance Sheet

- **Definition:** A snapshot of the company's financial position at a specific moment, detailing assets (what the company owns) and liabilities (what it owes).
- **Key Components:**
 - **Current Assets:** These are short-term assets expected to be converted into cash within a year.
 - **Examples:** Cash, marketable securities, accounts receivable, inventory, prepaid expenses.
 - **Fixed Assets:** Long-term assets used in the company's production process that last more than a year.
 - **Examples:** Vehicles, office furniture, machinery, buildings, land.

Tangible vs. Intangible Assets:

- **Tangible Assets:** Physical items (e.g., buildings, equipment).
- **Intangible Assets:** Non-physical assets that hold monetary value (e.g., patents, copyrights, brand names).

Extra Clarification:

- **Tangible Assets Example:** A company owning trucks for delivery.
- **Intangible Assets Example:** A software company holds copyrights to its products, which have value but aren't physically touchable.

Liabilities

- **Current Liabilities:** Short-term debts expected to be settled within a year.
- **Non-Current Liabilities:** Long-term debts, lasting over a year.
- **Example:** A loan taken by a company due in five years would be a non-current liability, while monthly supplier payments are current liabilities.

Stockholders' Equity:

- **Definition:** Represents the capital that investors have contributed in exchange for stock, as well as retained earnings.
- **Formula:**
 - **Basic Formula:**
Stockholders' Equity=Total Assets–Total Liabilities ○ **Alternative Formula:**
Stockholders' Equity=Share Capital+Retained Earnings–Treasury Shares

Profit and Loss Account

- **Definition:** Shows the company's revenues and expenses over a specific period, leading to either profit or loss.
- **For Non-Profit Organizations:** It is referred to as an **Income and Expenditure Account**.
- **Turnover:** Refers to the volume or value of shares traded on a stock exchange during a set period (e.g., day, month, or year).

Example:

- A company selling goods will report its total sales as **revenue** and subtract costs (e.g., manufacturing, salaries) to arrive at the **net profit**.

Cash Flow Statement

- **Purpose:** Tracks where the money is coming from (sources) and where it's going (destinations).
- **Explanation:** Much like how parents track children's spending to understand cash flow, companies track their money through this statement. It ensures that the business has enough cash to meet obligations like paying salaries, bills, and debts.

Relationship Between Financial Statements:

- The balance sheet, profit and loss account, and cash flow statement should be understood together for a holistic view of the company's financial condition.

Key Questions:

1. **Difference Between Current and Non-Current Assets?**
 - **Current Assets:** Converted to cash within a year (e.g., cash, inventory).
 - **Non-Current Assets:** Last more than a year (e.g., machinery, buildings).

2. Where Can You Find Non-Current Assets?

- Non-current assets are found on the **balance sheet** under fixed assets.

3. Where Does a Company Report Long-Term Debt?

- Long-term debt is reported on the **balance sheet** under **non-current liabilities**.

4. What Are Common Non-Current Assets?

- **Examples:** Buildings, land, machinery, patents.

ACM Code of Ethics and Professional Conduct

- 1. Contribute to Society and Human Well-being**
 - Use computing to benefit society, promote human rights, and protect individual autonomy.
 - Support environmental sustainability.
 - 2. Avoid Harm**
 - Prevent harm through responsible actions.
 - Minimize and mitigate unintended consequences.
 - 3. Be Honest and Trustworthy**
 - Be transparent in professional work.
 - Avoid misleading claims or actions.
 - 4. Be Fair and Don't Discriminate**
 - Treat everyone with equality and respect.
 - Do not engage in discriminatory or abusive behavior.
 - 5. Respect Work and Intellectual Property**
 - Give credit for others' work and ideas.
 - Follow copyright, patent, and licensing laws.
 - 6. Respect Privacy**
 - Protect personal data and privacy.
 - Use data responsibly and ensure its security.
 - 7. Honor Confidentiality**
 - Keep confidential information secure, except when disclosure is legally or ethically required.
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Professional Responsibilities

- 1. Strive for High Quality**
 - Maintain high standards in both work processes and results.
- 2. Maintain Competence**
 - Continuously improve professional skills and knowledge.
- 3. Follow Rules**
 - Abide by laws and regulations unless they are unethical.
- 4. Accept Professional Review**
 - Seek and provide constructive feedback on work.
- 5. Assess Systems Thoroughly**
 - Evaluate computer systems critically, including potential risks.
- 6. Work Within Areas of Competence**

- Only take on tasks for which you are qualified.

7. Foster Public Understanding of Computing

 - Promote awareness of computing's impact and responsibilities.

8. Access Resources Responsibly

 - Do not use systems or data without proper authorization.

9. Design Secure Systems

 - Ensure security is a key priority in all system designs.

Leadership Responsibilities

- 1. Focus on the Public Good**
 - Ensure that all computing work benefits society.
 - 2. Promote Social Responsibility**
 - Encourage ethical behavior in teams and organizations.
 - 3. Enhance Working Conditions**
 - Prioritize the well-being and dignity of workers.
 - 4. Support Ethical Policies**
 - Implement policies aligned with the Code of Ethics.
 - 5. Provide Opportunities for Growth**
 - Foster continuous learning and professional development.

Compliance with the Code

- 1. Uphold and Promote the Code**
 - Support adherence to the ethical standards of the ACM.
 - 2. Address Violations**
 - Treat violations of the Code as serious misconduct and take appropriate action.

other individuals involved in IEEE activities. We commit ourselves to the highest standards of integrity, responsible behavior, and ethical and professional conduct. We agree to be bound by the following rules:

1. Be Respectful of Others

- Treat all IEEE members, employees, and participants in a professional manner during IEEE activities.
 - Respect the privacy of others and ensure the protection of their personal information and data.
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2. Treat People Fairly

- Do not engage in any form of harassment or bullying (including sexual harassment) either in person or via cybertechnology.
- Do not discriminate based on legally protected characteristics such as:
 - Age
 - Ancestry
 - Color
 - Disability or handicap
 - National origin
 - Race
 - Religion
 - Gender
 - Sexual or affectional orientation
 - Gender identity or expression
 - Appearance
 - Matriculation
 - Political affiliation
 - Marital status
 - Veteran status

3. Avoid Injuring Others, Their Property, Reputation, or Employment

- Refrain from any actions that could harm others' property, data, reputation, or employment through false or malicious actions.
 - Do not spread malicious rumors, engage in defamation, or commit any other verbal or physical abuse, whether online or offline.
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4. Refrain from Retaliation

- Do not retaliate against any IEEE member, employee, or person who reports:
 - Acts of misconduct.
 - Violations of the IEEE Code of Ethics or this Code of Conduct.
 - Any violations of laws, rules, or regulations in connection with IEEE activities.
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5. Comply with Applicable Laws and IEEE Policies

- Abide by all applicable laws, rules, and regulations wherever IEEE does business.
 - Follow all IEEE policies and procedures when acting on behalf of IEEE or participating in IEEE activities, including but not limited to the following:
 1. **Reject Bribery:** Reject all forms of bribery.
 2. **Avoid Conflicts of Interest:** Avoid real or perceived conflicts of interest and disclose them when they exist.
 3. **Protect Confidential Information:** Safeguard IEEE's confidential information and the personal data of its members, employees, and other persons.
 4. **Prevent Anti-Competitive Behavior:**
 - Do not fix prices or reduce price competition by allocating customers or markets.
 - Do not manipulate bids in any competitive bidding process.
 - Avoid engaging in acts that restrain trade.
 5. **Respect Intellectual Property:** Do not misuse or infringe the intellectual property of others.
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BCS Code of Conduct

1. **Public Interest**
 - Ensure the well-being, privacy, security, and rights of others and the environment.
 - Promote equal access to IT for all and avoid discrimination based on gender, race, age, disability, or other protected characteristics.
2. **Professional Competence and Integrity**
 - Only undertake work within your competence and do not claim skills you do not have.
 - Continuously update your knowledge and comply with relevant legislation.
 - Respect alternative viewpoints and avoid harming others through negligence or malicious actions.
 - Reject bribery or unethical inducements.
3. **Duty to Relevant Authority**
 - Carry out your professional duties with care and professionalism, following the requirements of your employer or client (Relevant Authority).
 - Avoid conflicts of interest and maintain confidentiality.
 - Be honest about the performance of products or services and avoid taking advantage of others' inexperience.
4. **Duty to the Profession**

- Uphold the reputation of the IT profession and the BCS.
 - Participate in improving professional standards and support fellow members in their development.
 - Act with integrity in your relationships with other professionals and encourage adherence to this code.
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Appendix - Leadership Expectations

- Encourage the development of colleagues and ensure no one is penalized for raising concerns.
- Share knowledge and promote inclusion in the IT sector.
- Support colleagues who raise concerns about risks or wrongdoing (whistleblowing).

Balance sheet for a student

Perhaps the easiest way to get to understand the idea of a balance sheet is to look at the balance sheet not of a company but of an individual. We take an imaginary student called Jemimah Puddleduck and, as is usual, we show her present position side by side with the position a year ago, so that it is easy to make a comparison (see Table 6.1). Notice also the common accounting convention of putting a number in parentheses to indicate that it is negative, rather than using a negative sign as is normal in science or mathematics.

TABLE 6.1 *Balance sheet for a student*

Jemimah Puddleduck		
Balance Sheet		
As at 31 October 2004		
	2004	2003
ASSET		
Cash in hand	25	40
Cash at bank	361	220
Pre-paid accommodation	300	200
Debts owed by friends	18	0
Computer	400	600
CD player	160	180
Total assets	1,264	1,240
LIABILITIES		
Credit card bill	174	64
Student loans	4,800	1,900
Total liabilities	4,974	1,964
NET WORTH	(3,710)	(724)

Jemimah's most obvious asset is money. She has, let us say, £25, in cash in her purse and another £361 in her bank account.

The next two items are less obvious. The accommodation item refers to the fact that Jemimah has paid a term's fees to the hall of residence in advance; since the balance sheet refers to the position on 31 October, some 60 per cent (6 weeks out of 10) of this accommodation has not been used. Depending on the regulations of the hall, if the accommodation is no longer required, the student may be able to get a refund on the unused period or sell it to another student; in other words, the student has paid for the right to live in hall for a further six weeks and this right can be converted into cash and is therefore an asset. In a similar way, the debt of £18 owed by friends can be turned into cash and is also therefore an asset.

The next two items are more complex because they represent capital items. Jemimah owns a computer, which cost £800 including the software when her parents bought it for her, two years ago. She owns a CD player, which she bought for £200 at the start of her 2003 year. These are examples of

computer equipment over a period of three years and office furniture over a period of 10 years.'

Assets are generally valued on the basis of historic cost, that is, their original monetary cost. In times of high inflation, this can be seriously misleading. The value of certain types of fixed assets, in particular land and buildings, may increase rather than decrease. Some companies therefore arrange to have their property revalued from time to time and include this valuation in the balance sheet.

TABLE 6.2 *Balance sheet for a services company*

XYZ Software Ltd	2004 £'000	2003 £'000
Balance Sheet		
As at 31 October 2004		
Fixed Assets		
Intangible assets	475	–
Tangible assets	960	770
Investments	50	82
Total fixed assets	1,485	852
Current assets		
Work in progress	550	621
Debtors	3,400	2,580
Cash in hand and at bank	2,491	1,770
Total current assets	6,441	4,971
Creditors: Amounts falling due within one year	(3,210)	(2,601)
Net current assets	3,231	2,370
Total assets less current liabilities	4,716	3,222
 Creditors: Amounts falling due after one year		
Borrowings	(154)	(61)
Provisions for liabilities and charges	(7)	(16)
Net assets	4,555	3,145
 Capital and reserves		
Called-up share capital	318	308
Share premium reserve	350	145
Profit and loss account	3,887	2,692
Shareholders' funds – equity	4,555	3,145

Tangible fixed assets have to be recorded in the company's fixed asset register and, from time to time, their presence will be physically checked. Each year, depreciation must be calculated and, if a fixed asset is sold for a sum higher than its depreciated value, the company must show the difference as income. Because of these complicated procedures, it is usual to treat all

situations where there has been no capital investment. In more complicated cases, particularly with commercial organizations, other items enter into the relationship.

Just as in the balance sheet, there is a certain arbitrariness about the way in which items have been aggregated. We could, for example, have lumped together 'Food' and 'Entertainment' under the heading 'Living expenses' or split 'Transport' into 'Road' and 'Rail'. We have chosen to show the income from the summer job net (i.e. the take-home pay) rather than show it gross (i.e. before deductions) with tax and national insurance on the expenditure side.

TABLE 6.3 *Income and expenditure account for a student*

Jemimah Puddleduck		
Income and Expenditure Account		
Year ended 31 October 2004	2004	2003
INCOME		
Contribution from parents	1,500	1,300
Income from summer job (net)	1,840	1,682
Total income	3,340	2,982
EXPENDITURE		
Course fees	1,050	1,025
Hall fees	2,100	1,980
Books	30	25
Clothes and personal items	179	120
Transport	134	112
Food	1,400	1,247
Entertainment	1,303	840
Depreciation	220	220
Total expenditure	6,416	5,569
EXCESS OF INCOME OVER EXPENDITURE	(3,076)	(2,587)

Some explanation of the depreciation item is required. The net figure at the bottom of the profit and loss account should reflect the extent to which the organization – or, in this case, the individual – is better or worse off at the end of the year than at the beginning. Clearly, a fall in the value of the assets tends to make it worse off. Depreciation, although it is not an expenditure in the sense that cash is paid out, reflects this decline and is therefore shown as an expenditure. The figure of £220 arises from the depreciation on the computer and the CD player.

Commercial profit and loss accounts

The example of a profit and loss (or income and expenditure) account that we saw in the last section is typical of the account that might be produced by a small club. A commercial profit and loss account looks very different, even

though precisely the same ideas underlie it. Table 6.4 shows an example for a fictitious computer services company. Just as with the balance sheet, we see that items have been aggregated into very broad categories; the notes to the accounts will usually provide more detail. A package company, for example, might show in the notes how much of its income came from sales of packages, how much from training and consultancy, and how much from maintenance contracts.

TABLE 6.4 *Profit and loss account for a services company*

XYZ Software Ltd	2004	2003
Profit and Loss Account	£'000	£'000
Year ending 31 October 2004		
TURNOVER		
Continuing operations	14,311	11,001
Acquisitions	407	
Total turnover	14,718	11,001
Cost of sales	(11,604)	(8,699)
Gross profit	3,114	2,302
Other operating expenses	(1,177)	(805)
OPERATING PROFIT	1,937	1,497
Interest payable	(23)	(27)
Profit on ordinary activities before taxation	1,914	1,470
Tax on profit on ordinary activities	719	480
Retained profit for the year	1,195	990

A number of points about this statement need to be explained. First, the turnover for a company acquired during the year is shown separately from the turnover from continuing operations, that is, operations that were carried on in 2003 and 2004. This is to facilitate the comparison between the two years. In the same way, if part of XYZ Ltd had been disposed of in 2003, its turnover would have been shown under the heading 'discontinued operations'.

A second point is the distinction between 'cost of sales' and 'other operating expenses'. This distinction is an uncertain one and some companies do not show the items separately. However, for a package software company, there is a real difference between, on the one hand, expenditure on selling, printing documentation, installing software, and so on, all of which are the costs of sales, and expenditure on the development of new versions of existing packages or on new products, which would come under the heading of other operational expenses.

The bottom line shows the retained profit, that is, the profit not paid out in tax or dividends to shareholders; this is added to the retained profit in the previous year's balance sheet to give the value of the retained profit that is shown in the new balance sheet.

£2,900 from 2003 to 2004. This means that she received £2,900 in cash from that source. While it is an inflow of cash, it is not income, because it will have to be repaid; hence it does not appear as income on the income and expenditure account.

These changes are summarized in Table 6.5, which shows Jemimah's cash flow statement.

TABLE 6.5 *Cash flow statement for a student*

Jemimah Puddleduck		2004	2003
Cash flow statement			
Year ended 31 October 2004			
Cash inflow			
Addition to student loan	2,900	1,900	
Add back depreciation	220	220	
Total cash inflow	3,120	2,120	
Cash outflow			
From income and expenditure account	3,076	2,587	
Loans made to friends	18	0	
Total cash outflow	3,104	2,587	
Increase/(Decrease) in cash over the year	16	(467)	

Jemimah Puddleduck's cash flow statement tells us very little more than we could deduce from her other financial statements. In the case of a company, however, the cash flow statement has much more to tell us, because there are many more sources of cash flows.

FIGURE 6.1 *Sources and destinations of cash flows*

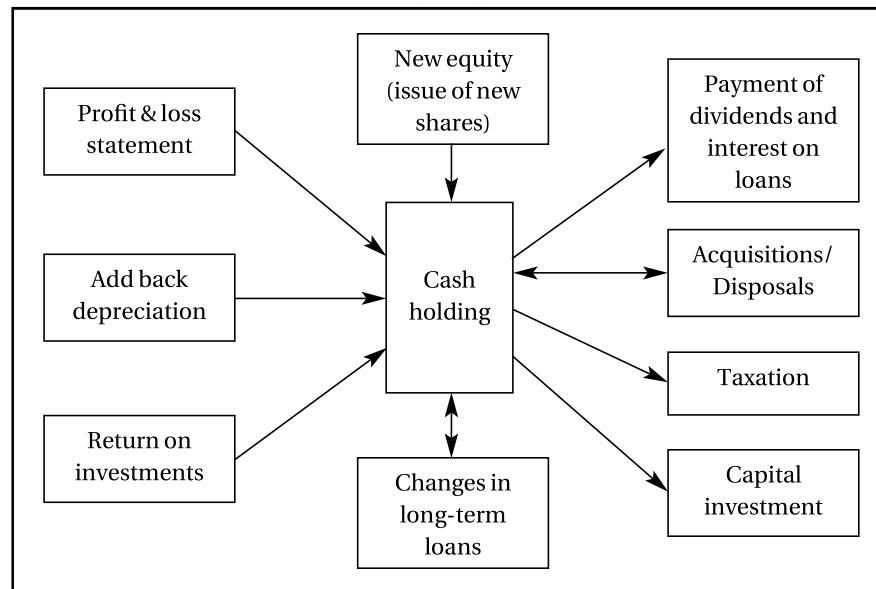


Figure 6.1 shows the cash flows that are captured in the cash flow statement of a typical company. The arrows show the normal direction of the flow in a profitable company, but it is always possible for the flows to be in the opposite direction. Table 6.6 shows the cash flow statement for our example company.

TABLE 6.6 *Cash flow statement for a software company*

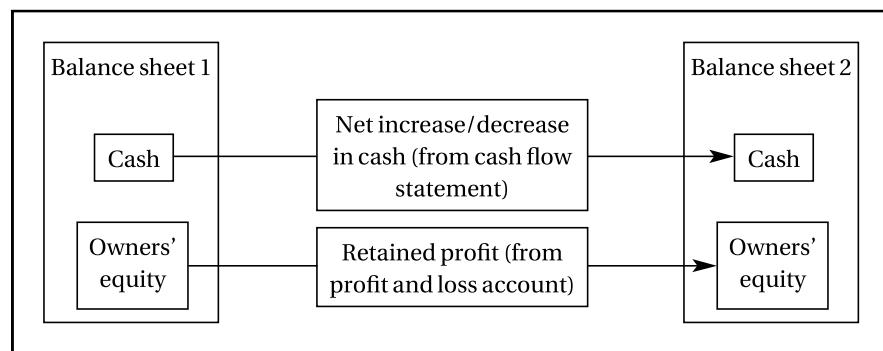
XYZ Software Ltd	2004	2003
Cash Flow Statement	£'000	£'000
Year ending 31 October 2004		
Net cash inflow from operating activities	2,105	1,620
Returns on investments and servicing of finance	(23)	(27)
Capital expenditure and financial investment	(320)	(265)
Taxation	(719)	(480)
Acquisitions and disposals	(380)	
Equity dividends paid		
Cash outflow before financing	(1,342)	(772)
Net cash inflow before financing	763	848
Financing		
Issue of share capital	215	100
Repayment of long term long-term loan	(50)	
Net cash inflow from financing	165	100
Increase in cash in the year	928	948

The first source of cash is the operating profit before tax generated during the year. This needs to be adjusted for certain items which may appear in the profit and loss account but do not involve the movement of money in or out of the company. The most obvious of these is depreciation. This was entered in the profit and loss account to reflect the extent to which the life of the fixed assets was consumed during the year; in no way did it reflect the movement of money out of the company and so it must be added to the profit.

Following the adjusted figure for the operating profit, there are a number of items that may lead to cash flowing out of the company for reasons that are nothing directly to do with its operations. Taxation, interest payable and dividends paid are obvious examples. Capital investment in equipment or premises is another reason for which cash may flow out of the company, as is the purchase of another company. In some circumstances, for example, the disposal of a subsidiary company, these items can give rise to an inflow of cash. When all these items are added together and subtracted from the operating profit, we arrive at a total figure for the inflow or outflow of cash into or out of the company before taking into account any changes in

relationship between successive balance sheets. This is illustrated in Figure 6.2. The profit and loss account explains the relationship between the owners' equity in the two balance sheets, while the cash flow statement explains the relationship between the cash item shown in the two balance sheets. This is illustrated in Figure 6.3.

FIGURE 6.3 How the cash flow statement and the profit and loss account affect the items in the balance sheet



EXAMINATION QUESTIONS

The examination questions below relate to the material covered in this chapter.

APRIL 2000 QUESTION 4

Explain the meaning of the terms fixed assets and current assets, illustrating your explanation with suitable examples.

[10 marks]

Fixed assets are items owned by a company that contribute to its productive capacity and are expected to be retained over a long period. Examples include:

- equipment such as computers or machine tools used in the company's operations;
- premises used by the company or let on a long-term basis;
- rights to computer software or brand names.

Current assets are items that are bought or sold in the course of the company's normal day to day trading operations. Examples include:

- consumables, such as printer paper,
- items bought from suppliers with a view to resale;
- items manufactured for sale.

Describe how the two types of asset are valued for balance sheet purposes, using as an example the following assets owned by a company that writes and sells software packages:

- **a stock of 500 user manuals for version 1 of a package, version 2 of which is to appear shortly. The company paid £5,000 to have 1,000 manuals printed and has been selling them at £25 per copy;**
- **a file server costing £15,000 that is used by the software development teams.**

[15 marks]

Current assets are valued at the lower of cost and resale value. The user manuals have been produced specifically to be sold to customers – they come under the heading of items bought from suppliers with a view to resale – and should therefore be treated as current assets. The cost price of the stock is $\text{£}5 \times 500 = \text{£}2,500$, while its resale value would appear to be $\text{£}25 \times 500 = \text{£}12,500$. At first sight, therefore, the stock should be valued at the lower of these two figures, that is, £2500. However, given that a new version of the package is about to appear and will, presumably, require a new edition of the user manual, it may be that most of the stock will be unsaleable. If we assume that only 50 of the remaining manuals can be sold, their resale value is $\text{£}25 \times 50 = \text{£}1,250$. This is lower than the cost price and should therefore be taken as the value of the stock.

Fixed assets are valued by assuming that their value declines from the initial purchase price to zero over their useful life. The file server that is to be used by the software development team clearly contributes to the productive capacity of the company and is therefore to be considered as a fixed asset. If we assume that its useful life will be three years, its value will fall by $\text{£}15,000/3 = \text{£}5,000$ per year. The value will therefore be £10,000 at the end of the first year, £5,000 at the end of the second year, and zero at the end of the third year.

APRIL 2001 QUESTION 4(b)

Your company is about to spend £25,000 on a powerful database server that is expected to be in use for the next five years. Explain the different ways in which it will affect the company accounts over that period.

[10 marks]

The purchase will affect the balance sheet, the profit and loss account and the cash flow statement.

The effect on the balance sheet will be to increase the value of the fixed assets by £20,000 at the end of the first year, £15,000 at the end of the second, £10,000 at the end of the third, and £5,000 at the end of the fourth.

The effect on the profit and loss account will be to increase the depreciation item under expenditure by £5,000 at the end of each year from the first to the fifth.

The effect on the cash flow account will be to increase the figure reported under the capital investment heading by £25,000 in the first year and to increase the figure added back under the heading of depreciation by £5,000 in years 1 to 5.

APRIL 2002 QUESTION 4

- a) Explain the meaning of the terms fixed assets and current assets, illustrating your explanation with suitable examples.**

[8 marks]

- b) Describe how the two types of asset are valued for balance sheet purposes, using as an example the following assets owned by a company that writes and sells software packages:**

- i) a stock of 1000 CD-ROMs containing version 1 of a package, version 2 of which is to appear shortly. The company paid £1,000 to have the CD-ROMs prepared and has been selling them at £100 per copy;**
- ii) an uninterruptible power supply costing £15,000 for the computer room housing the main servers.**

[17 marks]

OCTOBER 2003 QUESTION 2(b)

XYZ plc is a large import/export organization. It owns computer and communications equipment that cost some £45,000 in total when it was bought. The equipment was bought from ABC plc; some of it was held in stock at ABC and some of it was specially ordered by ABC.

Compare and contrast the way that the equipment would be treated in the accounts of the two companies.

[15 marks]

FURTHER READING

To get a feeling for company accounts and for the way the software industry works, it is worth reading the annual reports and accounts of software companies. Many of them are available directly from the companies' websites. As a starting point we suggest looking at LogicaCMG, the Sage Group, Admiral and IPL, all of which are readily available on the Web.

The book by Atrill and McLaney recommended at the end of Chapter 5 also covers the material in this chapter.