Profession: skill + experience + ethical standard
Practice: use of your skills, help you create value to a company
Professionalism: do job appropriately
Role of IT: Change business landscape (By enabling more function, such as offline shopping → online shopping) + provide ERP System + data driven analyze

Value: importance, worth, or usefulness of something
IT Investment: tangible hardware, intangible employee
Organization: people with (goal) to create value for stakeholders
Organization value: provide value, at an optimum level of return, to its stakeholders

## Organizational/Business

**Strategy:** a plan achieves goals&objectives. include IT strategy
**Goals**: direction; help measure progress + set the direction + improve decision-making
**Objective**: method to achieve a goal
**Model**: a description of how an organization creates, delivers, and captures value + based on the business strategy; Customers/clients/users + value proposition + financial model + capabilities; more than one

## IT

**strategy**: plan, IT investments, achieve business goals
**Operating Model**: role of IT, capability, how to deliver value, span whole IT lifecycle
Effectiveness, efficiency, effective risk, optimized performance
**Operational metrics** NOT organizational value, IS IT capabilities performance
**CEO**: the smartest technologist in a company
**value stream** end-to-end perspective from the stakeholder's point of view, defined at any level of an organization

### IT Lifecycle and Its Processes

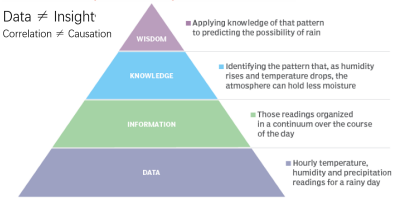
**Project**: tasks, deadline, specific goal, cross-functional; continuously deliver to user
**Program**: output of project
**Integrate**: form, coordinate, blend into a functioning or unified whole, shared resources, break silo
**TOGAF (Enterprise Architecture)**: Business, Data, Application, Technical; Improved decision-making, Optimization use of resources, Facilitates collaboration, Eliminate of inefficient, improve adaptability
**Traditional deployment focus**: non-functional+feature+funcationality; NOT Schedule
**Deming Cycle**: continuous improvement of processes Plan-Do-Check-Act
**Iterative IT Lifecycle**: Plan-Analyze-Implement-Test-Evaluate; Increased efficiency, More reliable user feedback, Increased risk of scope creep, Vague timelines; drive by need; Coding begins early on, Difficult to analyze risks, large project
**Agile**: iterative, small scale, cross functional teams, fast, difficult to estimate cost; large and small project; continuous
**DevOps**: Integrate dev and test; breaks large projects; Streamlined product delivery, high quality, Difficult to manage emerging product features; large project, continuous, fast
**Waterfall**: Straightforward, time cost, hard return to prior phases, small and mid-size
**ITSM**: approach increase efficiency to deliver value to customers/users continuously, align all aspects of devo and operation, Efficiency, gain; continuous

## Teams

**Team**: A group of people with a full set of complementary skills required to complete a task, job, or project. Forming→Storming(D)→Norming(U)→Performing(Max)→Adjourning
**Success Team**: shared task, clear membership, stability, smart goals, skills balance, good communication, Positive attitude
**Talent Sourcing**: Specialist company, Direct recruit, Consulting\Recruitment company
**Talent sourcing challenges**: find right talent, building a strong employer brand, sourcing processes are fair and equitable
**Talent Management Process Model**: Transitioning (old to new) + planning (understanding the talent needs) + attracting(culture) + developing + retaining
**Attract Talent**: reward, mentoring, career flexibility
**Change management (OCM)**: a structured process and set of tools for leading the people side of change to achieve a desired outcome. Employee resistance; Mitigates risks, Ensures long-term sustainability
**Project Management**: Focus on technical side Improved structure and resource distribution, Greater concentration and efficiency.
**Key roles in OCM**: "Executives, senior leaders" - sponsors of change; "Middle managers, supervisors" - coach for their direct reports; "Change manager"- apply structured approach
**OCM Model**: **McKinsey** (business impacts): strategy, structure, systems, shared values, skills, staff, and style; **ADKAR** (business and people): Awareness, Desire, Knowledge, Ability, Reinforcement; **Lewin** (sequencing): Unfreeze, Change, and Refreeze
**Project fail**: Undefined Objectives, Unorganized documentation and tracking, Poor leadership

## Information, Research, and Estimation

Data ≠ Insight
Correlation ≠ Causation




**Source**: the material from which ideas and information are gathered
Information can be reliable, but not valid, for example, an incorrect weather report
Information can be unreliable, but still valid, for example, Wikipedia
**Qualitative** studies rely on personal accounts or documents; NOT free from subjective. Interview, Focus Group, Observation, Document analysis, Oral.
**Quantitative** studies rely on numerical or measurable data. Survey, Document screening, Experiment
**Steps for Project Estimation**: SIZE→EFFORT→RESOURCES→DURATION→COST

### Six approaches for Project Estimation

**Function point**: based on its functionality
**Algorithmic**: based on Algorithmic model, unbiased, predict, not explain
**Component**: break into pieces
**Expert judgement**: cheap, fast; but subjective, depends on experience
**Sum of the parts**: work breakdown structure
**Estimation by Analogy**: Compare current project to similar project(s) already undertaken; fast, can be apply earlier; require related database

## Quality Assurance

**Quality Assurance (QA)** is a process, Throughout the development process; Entered approach focuses on enhancing and improving the process; ISO 9000 Customer focus, Leadership, Engagement of people, Process approach, Improvement, Evidence-based decision making, Relationship management.
**Quality Control (QC)** focuses on verify the quality (result), after developed
**Quality criteria**: Specific requirements and expectations
**Quality standard**: the benchmarks or guidelines
**Quality metrics** are the quantitative indicators that you use to track and report the quality of your project deliverables and processes.
**Maturity level**: initial→managed→defined→quantitatively managed→optimized
**3 types of audits**: "process" verifies that processes are working within established limits. "product" examination of a particular product or service, such as hardware. "system" conducted on a management system.
**1ST audit (internal)** is performed within an organization
**2ND audit (external)** is an external audit performed on a supplier
**3RD audit (both)** is performed by an audit organization independent of the customer-supplier relationship and is free of any conflict of interest.
**Audit scope**: physical system, software, cybersecurity, business continuity, data integrity
**Audit process**: Plan→fieldwork(collect, test)→reporting→follow-up
**Risk-based approach**: probability that the company's financial statement contains error; critical function system; Improve efficiency, enhance stakeholder satisfaction

### Software Testing

**Testing phase**: Requirements Review ➔ Test Planning ➔ Test Design ➔ Unit Testing ➔ Integration Testing ➔ System Testing ➔ User Acceptance Testing (UAT) ➔ Deployment Testing ➔ Regression Testing

Automated test is cheaper

| Aspect | Top-Down Integration Testing | Bottom-Up Integration Testing |
|---|---|---|
| Testing Direction | Starts from higher-level modules and goes downward | Starts from lower-level modules and goes upward |
| Initial Components | Real higher-level components; stubs or drivers for lower-level components | Real lower-level components; stubs or drivers for higher-level components |
| Dependencies | May require stubs or drivers for lower-level components | May require stubs or drivers for higher-level components |
| Advantages | Early validation of system functionality; supports high-level design | Early detection of critical component issues; supports parallel development |
| Drawbacks | Dependencies on incomplete lower-level components; delayed system testing | May require extensive use of stubs and drivers; complex coordination |

| Test Type | Purpose | Test Scenario | Example Question |
|---|---|---|---|
| Load Test | Assess performance under expected load conditions | Simulate concurrent users or transactions within expected limits | Can the system handle 1000 users concurrently? |
| Soak Test | Evaluate system stability over time | Sustain load over an extended period (hours/days) | How does the system perform after 72 hours of continuous usage? |
| Stress Test | Identify breaking points and recovery behavior | Push system beyond its limits, observe failures and recovery | What happens when the system receives 10 times the normal traffic? |

| | |
|---|---|
| Acceptance | Compares system functionality against agreed-on user requirements |
| Accessibility | Testing whether the product/software is accessible and usable for everyone |
| Component | each component behaves 'correctly'. |
| Functional | business requirements of an application. |
| Integration (Functional) | test interaction, combined module |
| Load (Non-functional) | testing the system under anticipated usage |
| Performance (Non-functional) | performance under maximum expected load. |
| Privacy | privacy risk |
| Recovery (Non-functional)S | recover from failures or crashes. |
| Sanity Test (Functional) | Verifies specific functionality changes in an application |
| Security (Non-functional) | vulnerabilities of app |
| System | Focuses on usual business processes, and normal workflow. |
| Stress (Functional) | extreme conditions or load beyond its operational capacity. |
| Smoke | Tests that check basic functionality of the application. |
| Soak | Tests the system with a significant load over an extended period. |
| Unit (Functional) | Tests individual units or components of the code |
| Usability (Non-Functional) | User friendly |
| White&black (Functional) | |

## Security Management

| | | |
|---|---|---|
| Denial of Service (DoS) | Overloading a system or service to make it unavailable | Website crashes due to excessive traffic or resource consumption. |
| Emails and Spam | Unsolicited emails, often for malicious purposes | Spam emails with malicious links or advertisements. |
| Clandestine Acquisition of Data (Trojan) | Malware disguised as legitimate software to steal data | A seemingly harmless software download that gives an attacker unauthorized access. |
| Zero-Day Attack | Exploiting unknown vulnerabilities before a patch is available | Attacking a software vulnerability that has not been fixed yet. |
| Phishing Attack | Deceptive communication to steal personal information | Emails pretending to be from a bank asking for login credentials. |
| Eavesdropping | Conversational monitoring | |
| Hacking | Expoiting vulnerability in system | |
| Malware | APP gain unauthorized access | |
| Man in the middle | intercepting the communication between 2 people | |
| Ransomware | encrypts data, lock someone device | |
| Rainbow | find the plaintext to a particular hash | |
| Spoofing | pretend to be someone you are not. To gain sensitive data | |
| Tampering | Act of modify device | |
| Virus | alter how a computer works, can damage computer | |

Match the source of cyber security threats to the correct definition.

Groups that use phishing, spam, spyware, and malware to conduct identity theft, online fraud, and system extortion to infiltrate systems or networks for financial gain.
Criminal Groups

Groups that conduct cyber attacks to destroy, infiltrate, or exploit critical infrastructure to threaten national security, compromise military equipment, disrupt the economy, and cause mass casualties.
Terrorist Groups

Groups or individuals that carry out cyberattacks in support of political causes rather than financial gain.
Hacktivism

Employees, third-party vendors, contractors, or other business associates who have legitimate access to enterprise assets but misuse that accesses to steal or destroy information for financial or personal gain.
Malicious Insiders

Individuals who conduct industrial or business espionage to either make a profit or disrupt a competitor's business by attacking critical infrastructure, stealing trade secrets, and gaining access.
Corporate Spies

Remediate any infections as quickly as possible before they progress.
Malware Infection

Configure your critical systems to record all privileged escalation events and set alarms for unauthorized privilege escalation attempts.
Unauthorised Privilege Escalation

Identify the privileged user accounts for all domains, servers, apps, and critical devices and ensure that monitoring is enabled for all systems
Insider Breach

Detect, monitor and investigate unauthorized access attempts – with priority on those that are mission-critical and/or contain sensitive data.
Unauthorised Access

**Security Management Frameworks**: ITIL, Cobit, NIST Cyber Security Framework
**Security Management challenge**: change user attitude, up to date, lack of understanding by senior management.
**Five categories of security threats** 1 Unintentional acts (Human error, carelessness, ignorance); 2 Natural disasters; 3 Technical failures (Hardware failure); 4 Management failures (Ineffective procedures and controls); 5 Deliberate acts (Vandalism and malicious damage)
**Privacy**: should you store this data? what is it for? is it all necessary?
**Accuracy**: is it correct, complete and current?
**Property**: who owns it? can it be sold to others?
**Accessibility**: confidentiality: who has access to the data? when and for what purpose may it be used?
**Authentication**: determine user is who claimed to be
**Cyber kill chain**: Reconnaissance, prob → Delivery, attack → exploitation, install → System Compromise

**Info security** (Not only digit) > **Cyber S** (digit) > **Network S** (transfer integrity)

**GDPR**: enhance privacy rights and address risks associated with data processing

- Scope and Applicability: The GDPR applies to all organizations that process personal data of individuals residing in the European Union (EU), regardless of the organization's location
- Accountability and Penalties: Organizations are accountable for complying with the GDPR and must be able to demonstrate their compliance. Non-compliance can result in fines of up to
  - T1: 2%, € 10 million
  - T2: 4% of annual global turnover or € 20 million, whichever is higher.

**Individual right**:

- Informed Consent
- Access to Information record
- Anonymity or Pseudonymization
- right to be forgotten

**Cybersecurity Standards**

- ISO/IEC 27001:comprehensive security controls
- NIST: guidelines to manage and reduce cybersecurity risks
- PCI DSS: secure payment card data
- HIPAA: healthcare information

**Social Engineering** is psychological manipulation that tricks people into revealing sensitive information or taking actions, aiding cyberattacks

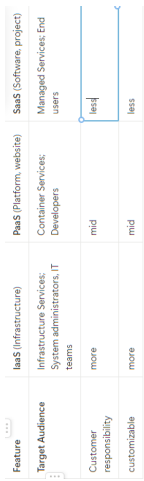
**Data Life Cycle**: CREATE→STORE→USE→SHARE→ARCHIVE→DESTROY

**STRIDE Model**: Spoofing, Tampering, Repudiation, Information Disclosure, Denial of Service (DoS), Elevation of Privilege

| | Disaster Recovery (DR) | Business Continuity (BC) |
|---|---|---|
| Focus | IT systems and data recovery | Overall business operations |
| Objective | Minimize IT downtime | Ensure business continuity |
| Scope | Limited to technology | Holistic, including people, processes, technology |
| Timeframe | Short-term recovery | Long-term sustainability |
| Components | Data recovery, backup | Crisis management, planning |
| Testing | IT systems and data | Comprehensive business plans |
| Dependency | Subset of Business Continuity | Encompasses Disaster Recovery |

| Type 1 virtualisation | Type 2 virtualisation |
|---|---|
| Also known as "bare-metal" virtualisation | Also known as "hosted" virtualisation |
| Hypervisor is installed directly on the host machine's hardware | Hypervisor runs on top of a host operating system |
| Offers better performance and security since it has direct access to hardware resources | Has more overhead since it runs on top of a host operating system |
| More complex to set up and manage but more efficient for large-scale virtualisation | Easier to set up and manage but less efficient for large-scale virtualisation |
| Examples include VMware ESXi, Microsoft Hyper-V, Citrix XenServer | Examples include Oracle VirtualBox, VMware Workstation, Parallels Desktop |

**Virtualization** allows multiple virtual machines (VMs) to run on a single physical machine by partitioning the resources of the physical machine into multiple virtual environments





**C**: only authorized user can access necessary data
**I**: No one change data during transfer
**A**: work properly by authorized user

# Communication

**Characteristics of professional writing**: Clarity (Clarity refers to how easily the message can be understood), Precision (conveying the exact meaning with the fewest words possible), Objectivity (without bias), Brevity (effective, being concise and to the point)↓
**Components of paragraph**: Topic sentence + body + conclusion↓
**Cohesion**: the presence of a clear and logical flow of ideas. It focuses on how well the individual parts of the text (sentences, paragraphs, etc.) are connected to each other. Use "therefore," "however,"↓
**3C**: Clarity + Coherence (fluency, logic organized well) + Consistency(**typography**)
**Anatomy of a presentation**: Message, structure, timing, physical factors, personal factors, visuals(ppt)↵

Which of the following is a form of written communication?
that are applicable).

**Speed** is not necessary for write

- [ ] Faxes
- [x] Emails
- [x] Letters
- [x] ~~Voice Recording~~
- [x] Manuals
- [ ] Instant Messages

To be effective written communication should use the correct tone, inoffensive language and appropriate grammar. — ~~Clarity~~

Correctness

The message should show the sender's expression as well as should respect the receiver. The sender of the message should be sincerely polite, judicious, reflective and enthusiastic. — ~~Consideration~~

Courtesy

Effective communication must give thought to the audience. The words of the message should be modified to suit the audience's needs. — ~~Cause~~ Consideration

Forms a link between the reader and the writer. — ~~Completeness~~

Connection

Clear and easy to understand. — ~~Completeness~~

Clarity

The reason for writing needs to be clear to both the writer and the reader. — ~~Completeness~~

Cause

Good written communication should communicate what you want to convey in the least possible words. — ~~Connection~~ Concise

The message should be particular and clear rather than unclear andgeneral — Concreteness

The communication should convey all the facts required by by the audience. — ~~Completeness~~

Completeness

Which of the following should be true about written communication?
(Select all that are applicable).

- [x] Reliable
- [x] Provides a permanent record
- [x] Simple
- [x] Complex

# Ethics

**Etiquette**: (not right or wrong) Codes of behavior and courtesy↓
**Law**: Series of rules that are enforced by the police and the courts↓
**Morals**: Standards of right and wrong generally accepted by a culture or society↓
**Ethics**: rules that acceptable conduct in society; *"Equity, Fairness, Honesty, Truth"* (NO Equality)↓
**Integrity**: Adhering to a moral code in daily decision making↓
**Character**: Drive what we do when no one is looking↵

**Personal ethics** the set of an individual's own ethical commitments, usually acquired in early home or religious training but often modified by later reflection; *"Honesty, Loyalty, Integrity, Treating other fairly, Selflessness, Responsibility"*↓
**Professional ethics** a set of standards adopted by professionals to apply when they are acting in their professional capacity; *"Accountability, Punctuality, Confidence, Respect, Maintaining Privacy,"* ↵

**Teleology**: Decide on actions based on goal (irrespective of outcome)↓
**Consequentialism**: Decide on action based on outcome↓
**Egoism** Value of a state is based on your individual situation↓
**Utilitarianism** Value of a state is based on total situation of all people↓
**Deontological**: Decide on actions based on duty↵

Data mining, privacy, conflicts of interest, intellectual property, unauthorized access

# Decision Making

**Business Intelligence**: Data+ETL+OLAP; enables the business to make intelligent, fact-based decisions. you can get data in a timely manner.↓
**Unstructured Data Processing**: Upload + Categorize + Tune + Analyze↓
**BI Components**: data warehouse, analytic tools, performance monitor, user interface↓
**Benefit of BI**: One version, consistent KPI, Integrated access to multiple data↵

**ETL**: Extract data from multiple diverse data, Transform data to fit operational needs, Load data into target database↵

**Data warehouse**: A physical repository store data. user can use data to analyze, better quality data, timely info↵

**OLAP**: Advanced tool for decision making; slicing (one attribute, only based on date), dicing (multiple attributes, date and country), drill down (detail, specific month data), roll up (higher view, year data), pivot (Pivoting allows you to switch the rows and columns of a table. If you initially had months in rows and countries in columns, pivoting might switch the two so that you have countries in rows and months in columns. This changes the perspective of how the data is compared and analyzed.)↵

**Decision making process**: Identify problem→gather info→consider outcome→make decision→evaluate decision↵

Clearly define the nature of the decision you must make.

Identify the decision

Collect some pertinent information before you make your decision: what information is needed, the best sources of information, and how to get it.

Gather relevant information

List all possible and desirable alternatives.

Identify the alternatives

Draw on your information and emotions to imagine what it would be like if you carried out each of the alternatives to the end. Evaluate whether the need identified would be met or resolved through the use of each alternative.

Select the alternative that seems to be best one for you

Choose among alternatives

Take some positive action by beginning to implement the alternative you chose

Take action

Consider the results of your decision and evaluate whether or not it has resolved the need you identified

Review your decision & its consequences

Which of the following are common biases that may effect your decisions?

Bias

- [ ] Decline Bias
- [ ] Selection Bias
- [x] Confirmation bias
- [x] Halo Effect
- [x] Anchoring bias
- [ ] Hindsight Bias
- [x] Availability heuristic
- [x] Survivorship bias

This model provides decision makers with the opportunity to contemplate on the things that matter the most in their situation and select the choices that best reflect their standards.

Rational Decision-Making Model

This model is less structured and opts for more subjective opinions, it is a sophisticated process in which the decision maker applies their intuition in many ways.

Intuitive Decision-Making Model

This model is used when the decision maker has to come up with an original and unique decision for a situation. The success of it depends mainly on the decision maker's personal traits such as his creativity and the contextual situation.

Creative Decision-Making Model

This model incorporates contextual assessment and metal evaluation to come up with the best reaction to a problem. Decision makers consider only one option instead of weighing several choices at a time.

Recognition-Primed Decision Making Model

Instead of rigorously seeking the best possible decision, you're just looking for a "good enough" decision.

Bounded rationality decision-making model

**Comon factor of decision model**: Implementing the decision or solution, identifying problem↵

**Rational**: ↵
Pro: based on data, emotionless, face a lot factors↵
Con: limited by insufficient info, Time limit↵

**Bounded Rational**↵
Pro: when info and time is limited↵

**Intuitive**: ↵
Pro: Quick, See everything as a bigger picture, positive feeling
Con: heavily on experience, less effective↵

**Creative**: ↵
Con: based on decision maker trait↵

**Recognition**: ↵
Con: Based on experience and expertise, Time-consuming↵