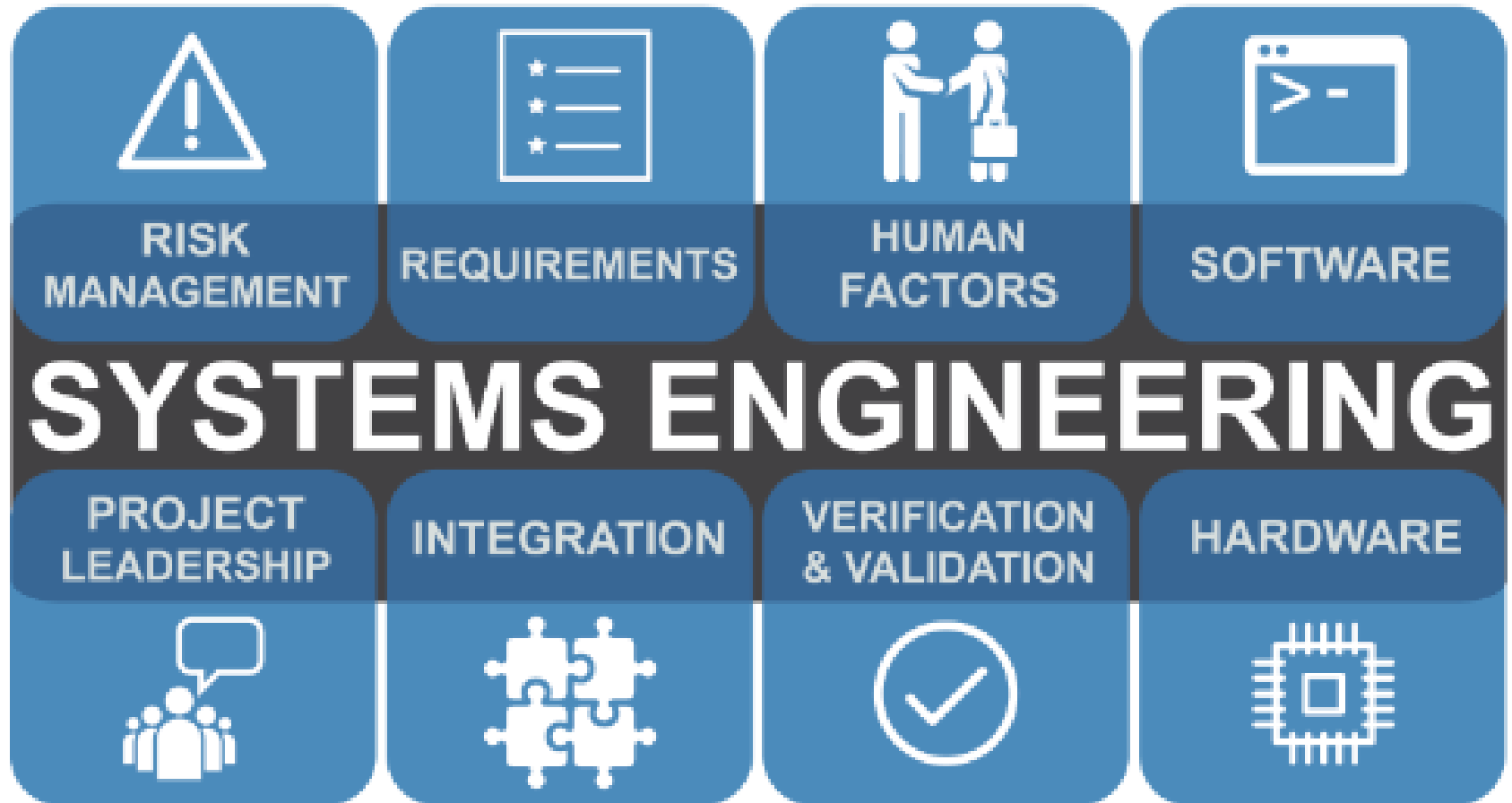


Systems Engineering Overview



Requirements Capture and Analysis



How the customer explained it



How the project leader understood it



How the engineer designed it



How the programmer wrote it



How the sales executive described it



How the project was documented



What operations installed



How the customer was billed

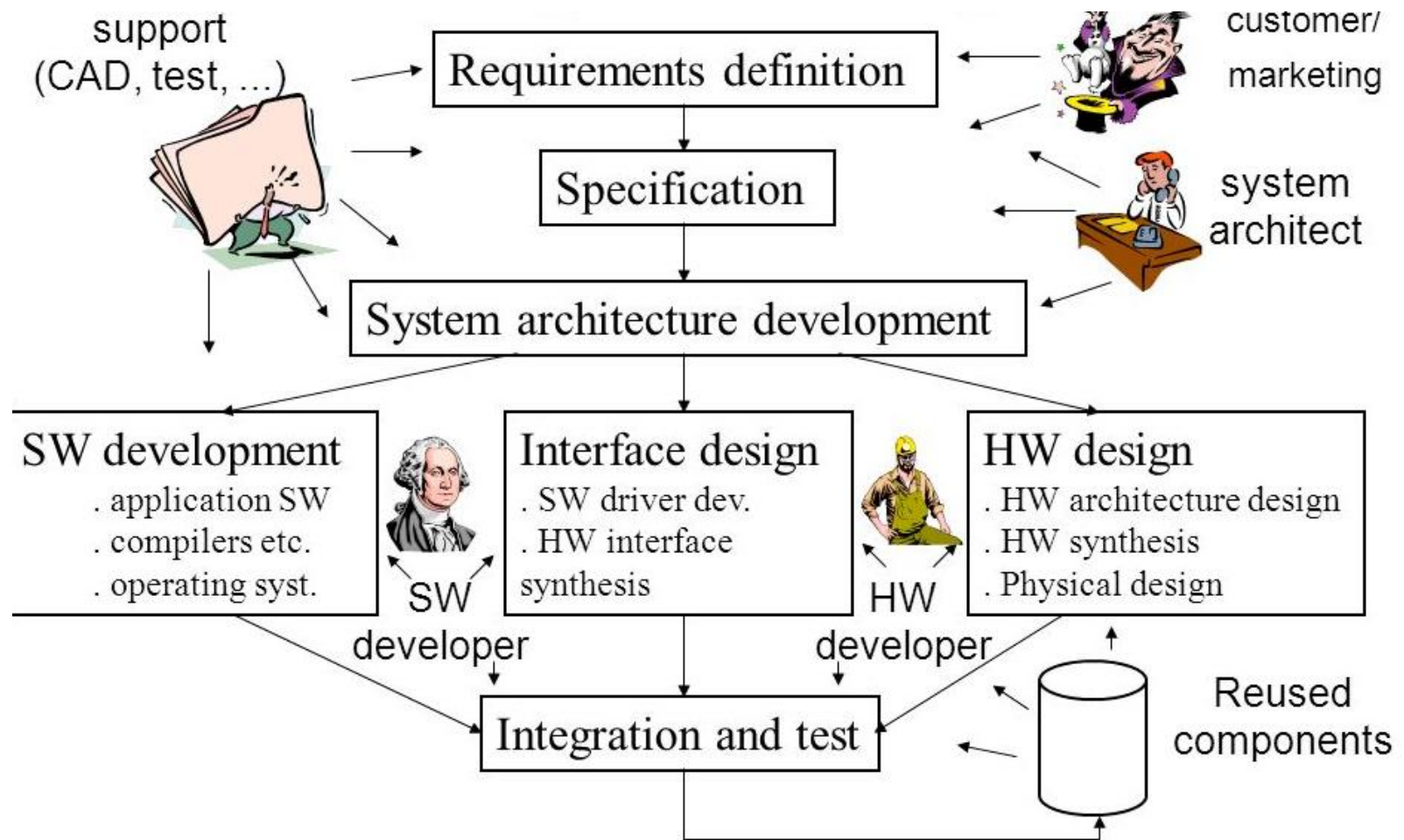


How the helpdesk supported it

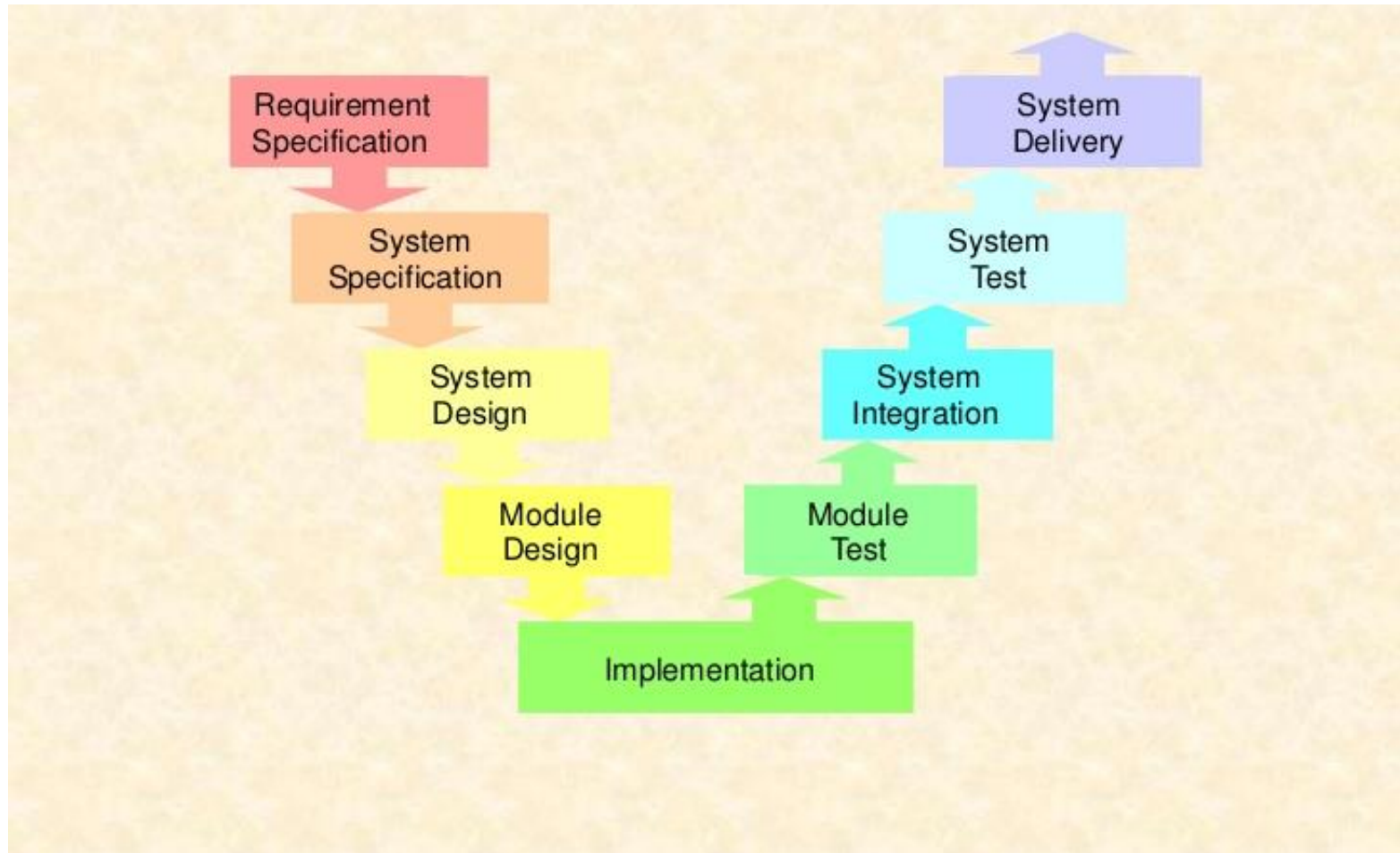


What the customer really needed

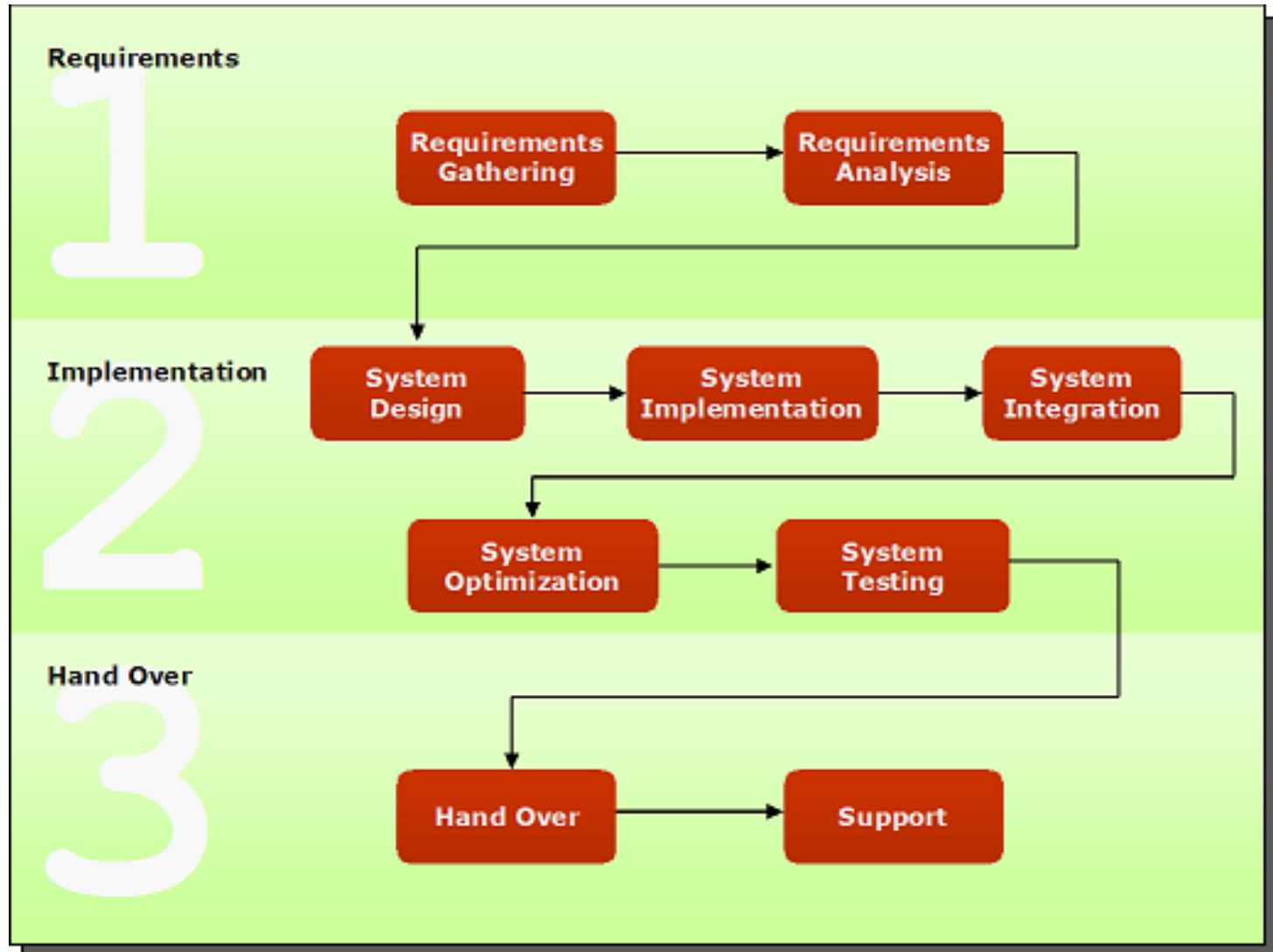
Embedded System Design Process



Industrial Development Process



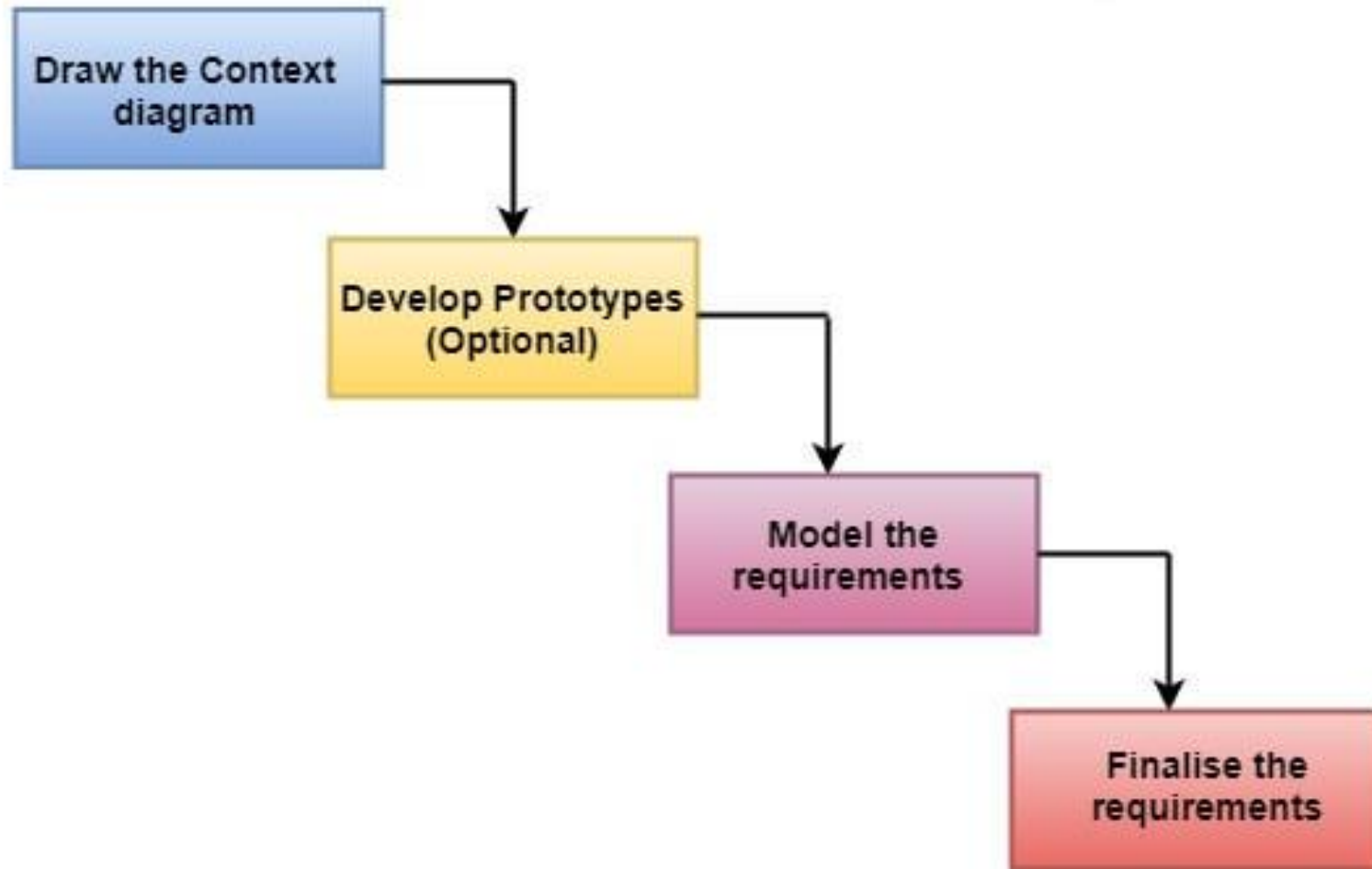
Embedded Systems Process



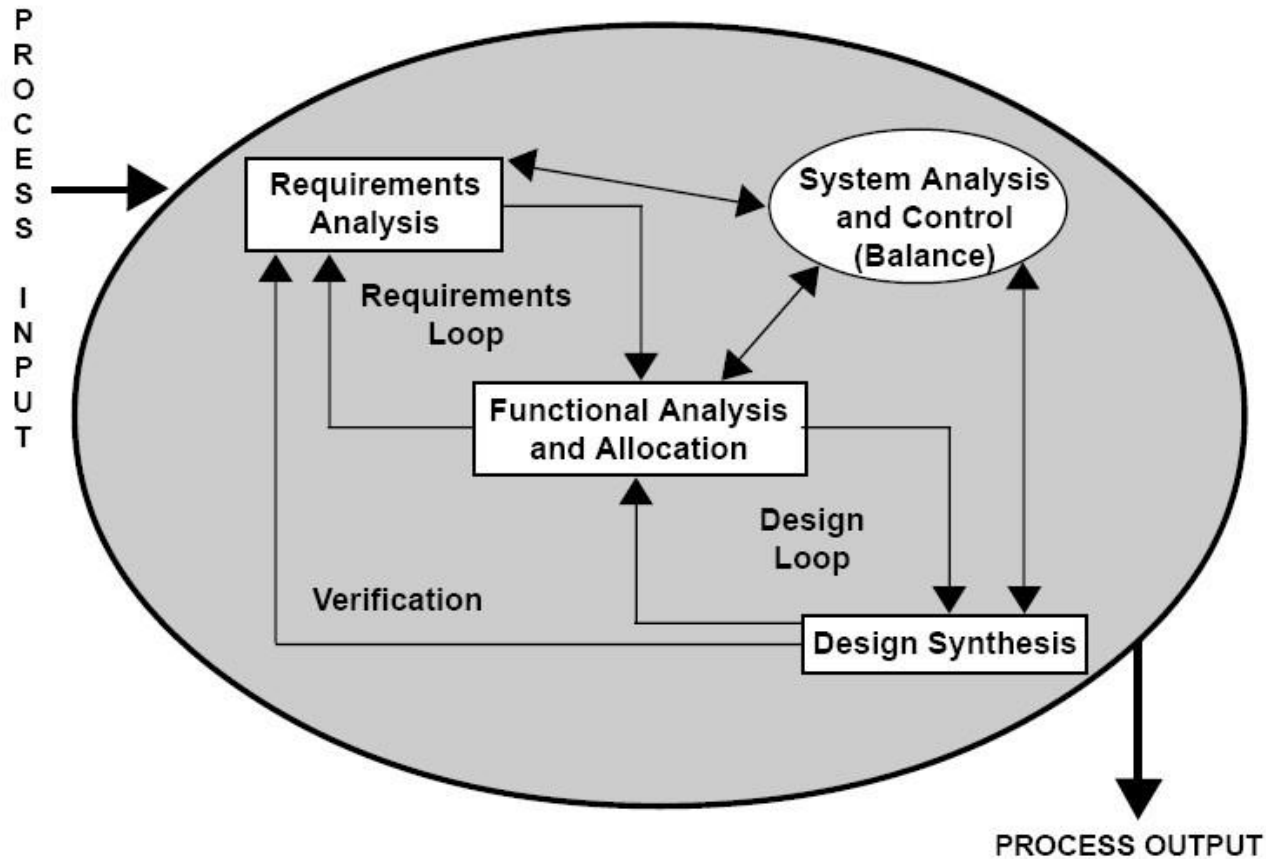
Capturing Customer Requirements

PHASE	OBJECTIVE	TOOLS
Identify	Identify who the customers are for the project	• SIPOC
Capture	Capture their requirements	• Surveys • Interviews • Focus groups • Existing data • Market research
Analyse	Analyse both quantitatively and qualitatively.	• Extended SIPOC • Affinity diagrams • Segmentation
Translate	Translate the requirements into meaningful data for the project	• CTS trees • Kano analysis

Steps of Requirement Analysis



General flow Diagram for Requirements analysis



Definition of Requirements Analysis

In both systems and software engineering, **requirements analysis** focuses on the tasks that determine the needs or conditions to meet the new or altered product or project, taking account of the possibly **conflicting requirements** of the various stakeholders.

Requirements Analysis Activities

1.Eliciting requirements: the task of communicating with customers and users to determine what their requirements are. This is sometimes also called requirements gathering.

2.Analysing requirements: determining whether the stated requirements are unclear, incomplete, ambiguous, or contradictory, and then resolving these issues.

3.Requirements modeling: Requirements might be documented in various forms, such as natural-language documents, use cases, user stories, or process specifications.

4.Review and retrospective: Team members reflect on what happened in the iteration and identifies actions for improvement going forward.

Requirement Analysis Procedure

Requirements analysis is a team effort that demands a combination of hardware, software and human factors engineering expertise as well as skills in dealing with people. Here are the main activities involve in requirement analysis:

- **Identify customer's needs.**
- **Evaluate system for feasibility.**
- **Perform economic and technical analysis.**
- **Allocate functions to system elements.**
- **Establish schedule and constraints.**
- **Create system definitions.**

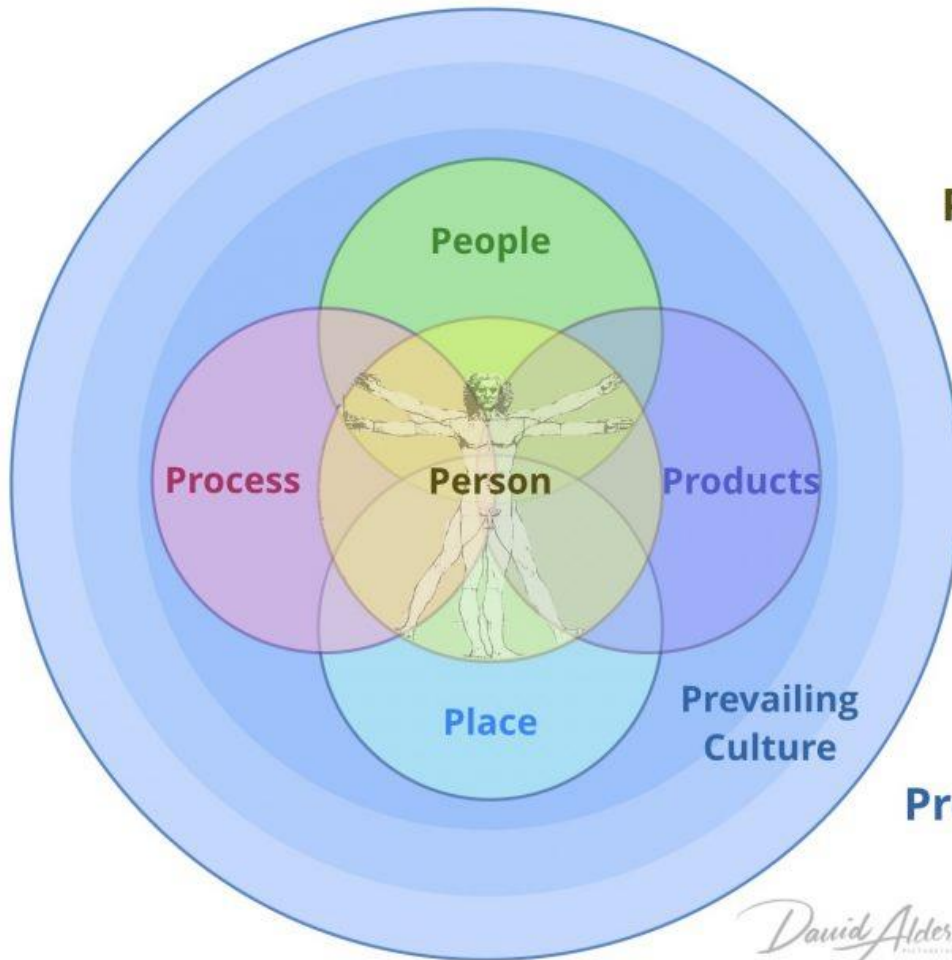
Requirement Analysis Checklist

			Progress	Action	Description	Requirements	Priority	Status	Reviewed	Approval Status	De
				Project Requirements:	Project Pluto						
				Project Initiation	Basics to getting started						
				Vision Statement	Overview of project goals and benefits	Attach project overview document	!		☒	Approved	03
				Executive Approval	Signoff and sponsorship	Copy email or other approval	—		☒	Approved	
				Funding Secured	Financial commitment to pursue definition	Attach budget or copy email	!		☒	Approved	
				Requirements Discovery & Research	How and where to gather requirements?						
				 Identify Capture Techniques	How will you collect the information?	[Attach prep materials and results to each row]			☒	Approved	
				Brainstorming	Use to collect a flow of ideas in quantity; qualify and improve on them later	Conduct team level sessions	↓		☒	Submitted	
				Data Analysis	Review behavioral data on successful and failed pathways, including product sale, use, service experiences, etc		!		☐	Approved	
				Document Analysis	Review existing as-built specifications, customer documentation, marketing materials, and similar materials from competitive products	Make data request to BI team and create analytics dashboards	—		☒	Needs review	
				Feedback	Service calls, logs, reports, emails, and field anecdotes				☐	Needs review	
				Focus Groups	Use to collect new requirements, or to respond to proposed requirements. but				☐	Submitted	

What Are Human Factors?

We define **human factors** as: the study of all the factors that make it easier to do the work in the right way. Another definition of human factors is the study of the interrelationship between humans, the tools and equipment they use in the workplace, and the environment in which they work

Human Factors



Person self-awareness, fatigue, workload, capabilities
situational awareness, decision making

People teamwork, communication, leadership

Process tasks, procedures, guidelines,
scoring systems, checklists, bundles

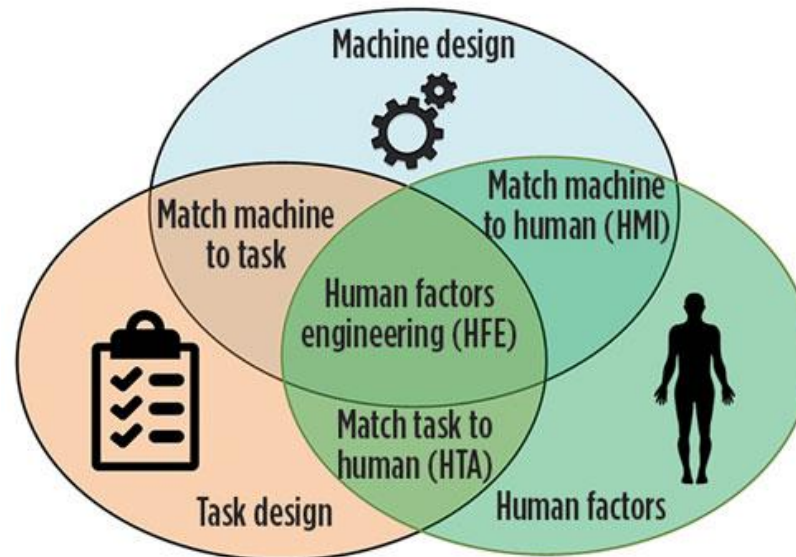
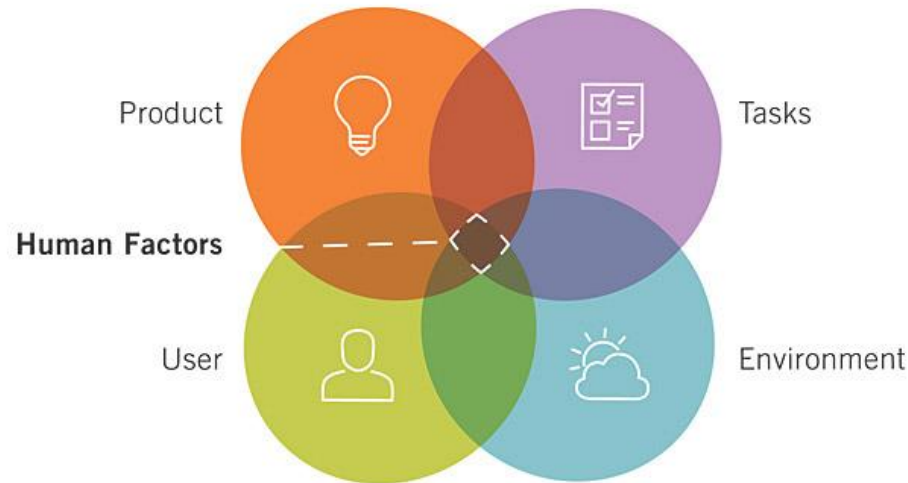
Products equipment, technology, medical devices,
procedural tools, manual handling aids

Place environment, lighting, sound, temperature,
space, layout, location

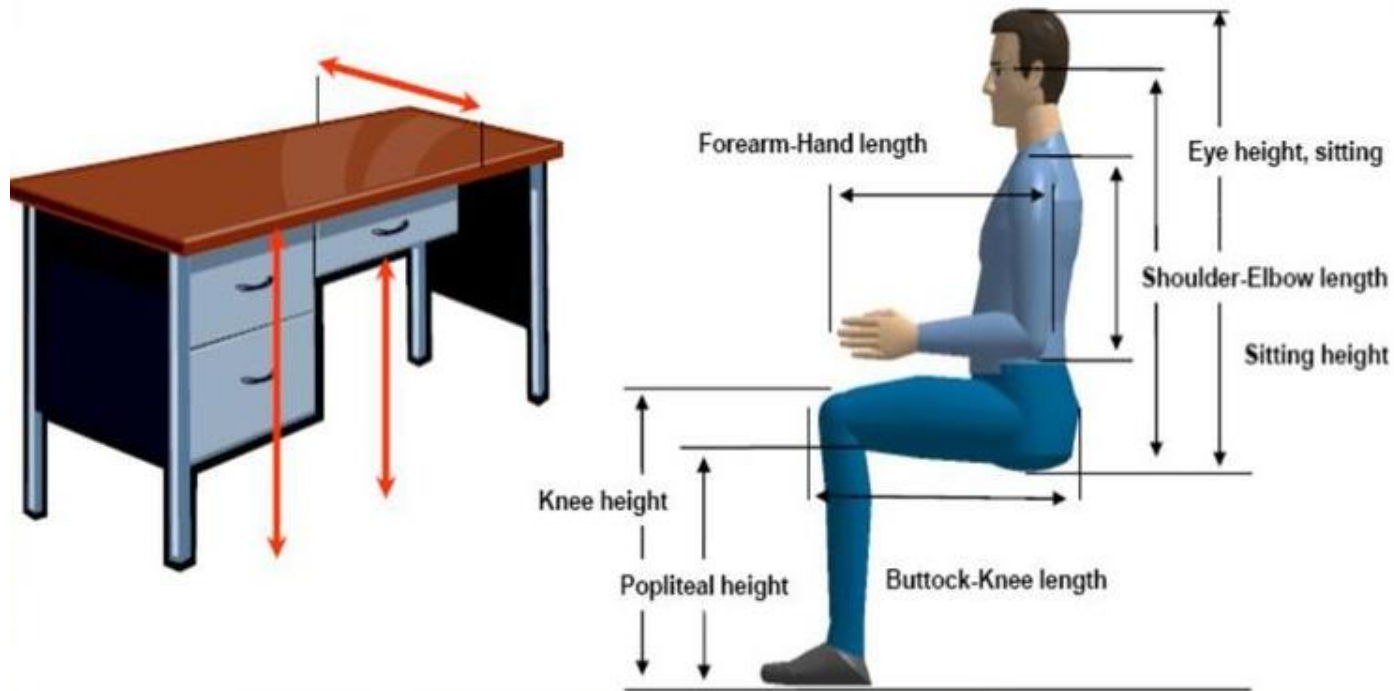
Prevailing Culture local - hierarchy, climate
organisational - values, norms
societal - policy, regulation

David Alderson
DAVIDALDERSON.CO.UK

Human Factors Venn Diagrams



Design and Human factors (ergonomics)



www.SixSigmaAcademyAmsterdam.com



Functions and Functionality

