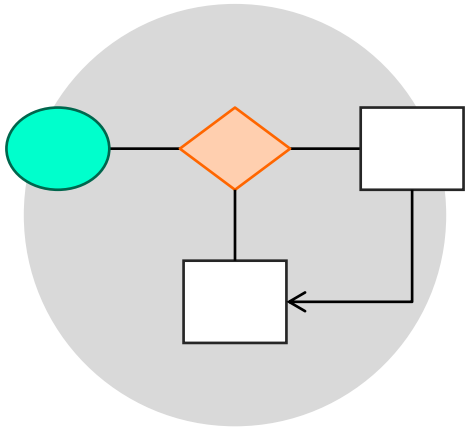
Continuous Improvement Toolkit

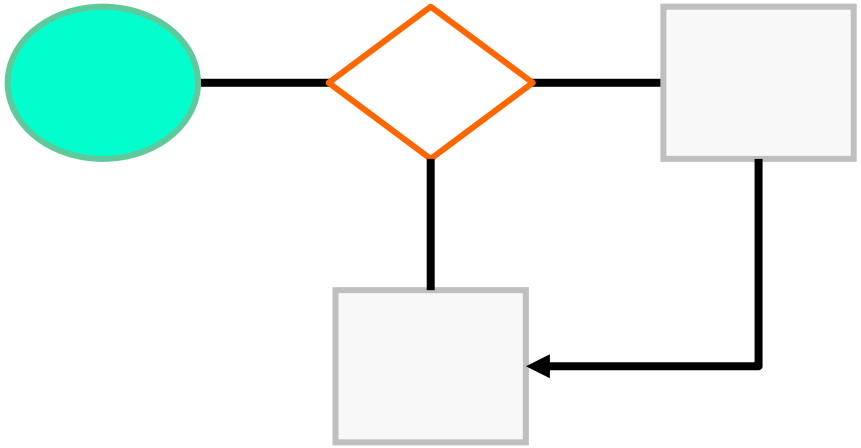
Flowcharting



The Continuous Improvement Map

Flowcharting

A graphical tool that illustrates the **flow of a business process** and the relationships between its activities



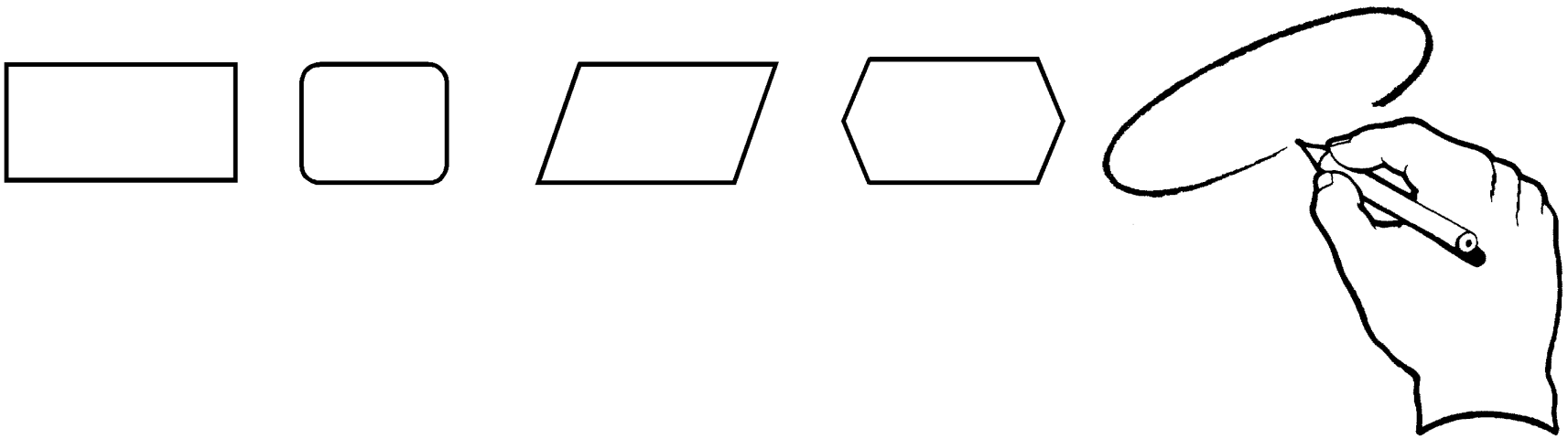
Flowcharts can be used for any process and **in any industry**

Flowcharting

Used to **break up processes** into individual activities

This **detailed view** will allow to see how a process looks like

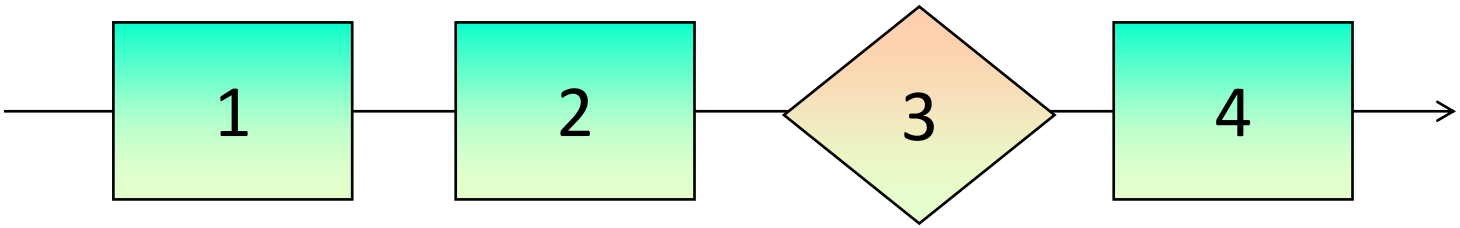
Flowcharting



Ideal charts to **visually represent** business processes. For example, if you want to see the flow of a purchase order or a sales order through the various departments within your company, flowcharts are the best means.

Flowcharting

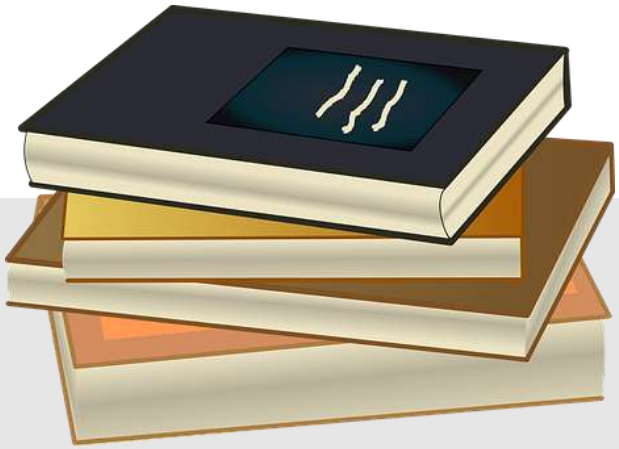
Useful for **understanding and communicating** the sequence of activities and how a process works



Helps you and your team to understand the activities and decisions, and thus, perform the tasks **correctly** and in the **right order**

Flowcharting

Often used for **documenting** how to do a particular job



Can be found in procedures and **quality manuals**

Flowcharting

Used when **designing** new processes and refining the old ones

Used to provide a detailed view of how a process should be

Flowcharting

Software developers use them to map processes that need to be automated

Flowcharting

Kaizen teams use them to identify and analyze problem areas and provide insight in order to . . .

- Simplify the work
- Reduce cycle times
- Troubleshoot problems
- Improve or redesign processes

Discovery → Control → Improvement

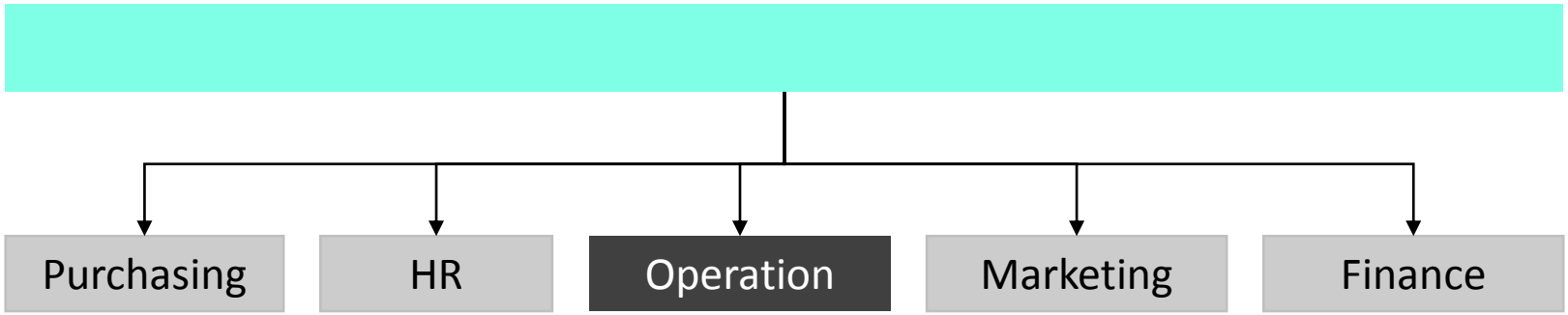
Flowcharting

Useful for revealing the areas of **inefficiency** and diagnosing problems for later problem-solving efforts

- Redundant activities
- Unnecessary activities (NVA)
- Excessive delays
- Rework

Flowcharting

Allows to look at the organization horizontally instead of vertically by looking at how departments and functions are **interacting** and working together



They show how an organization produces its outputs through **cross-functional processes**

Flowcharting

Other Benefits

Provides a **common understanding** when discussing and analyzing processes

Provides **clarity** to a process that appears disordered or complicated

Facilitates the understanding of relationships and **time sequences** within a process

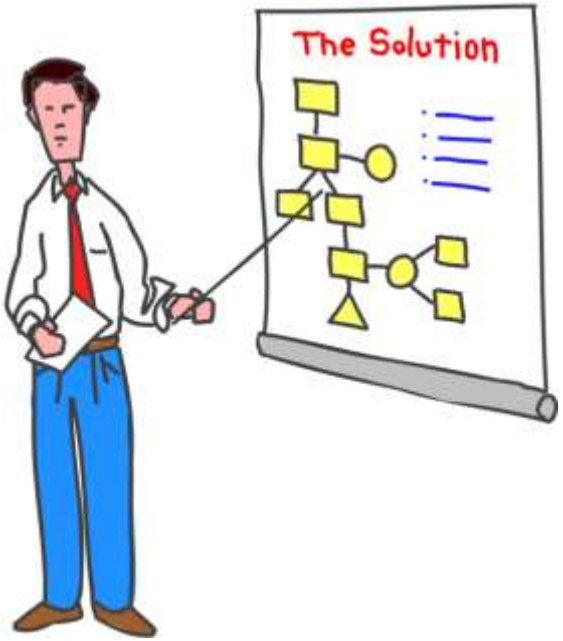
Flowcharting

Other Benefits

Helps **communicating** any changes on the process

Helps explaining the process to **new employees** and subcontractors

Helps **suppliers** understanding the process before parts or items are supplied



Flowcharting

Other Benefits

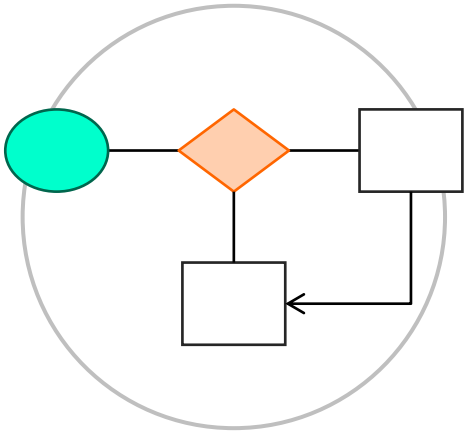
Helps addressing **risk factors** within a process

Allows to see **improvements** made on the processes

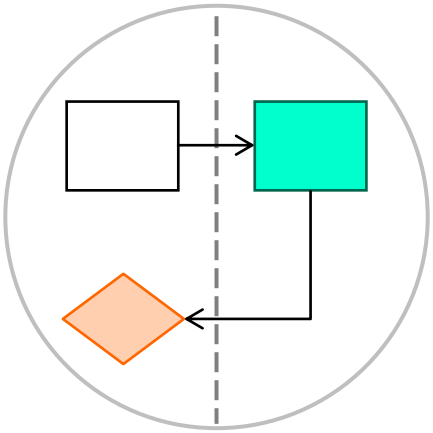
Helps investigating the **performance** of a processes (e.g. cycle time)

Flowcharting

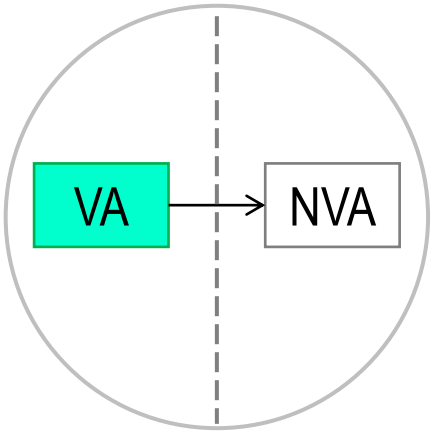
Flowchart Types



ACTIVITY



SWIMLANE



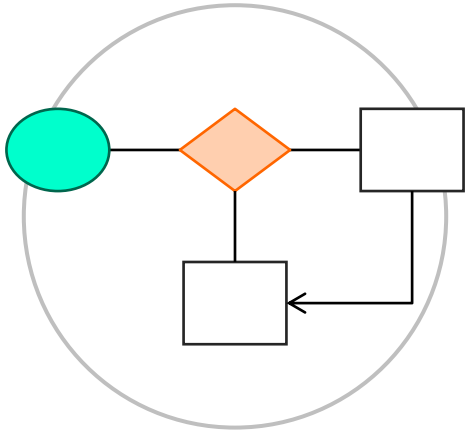
OPPORTUNITY

INDUSTRY-SPECIFIC

Flowcharting

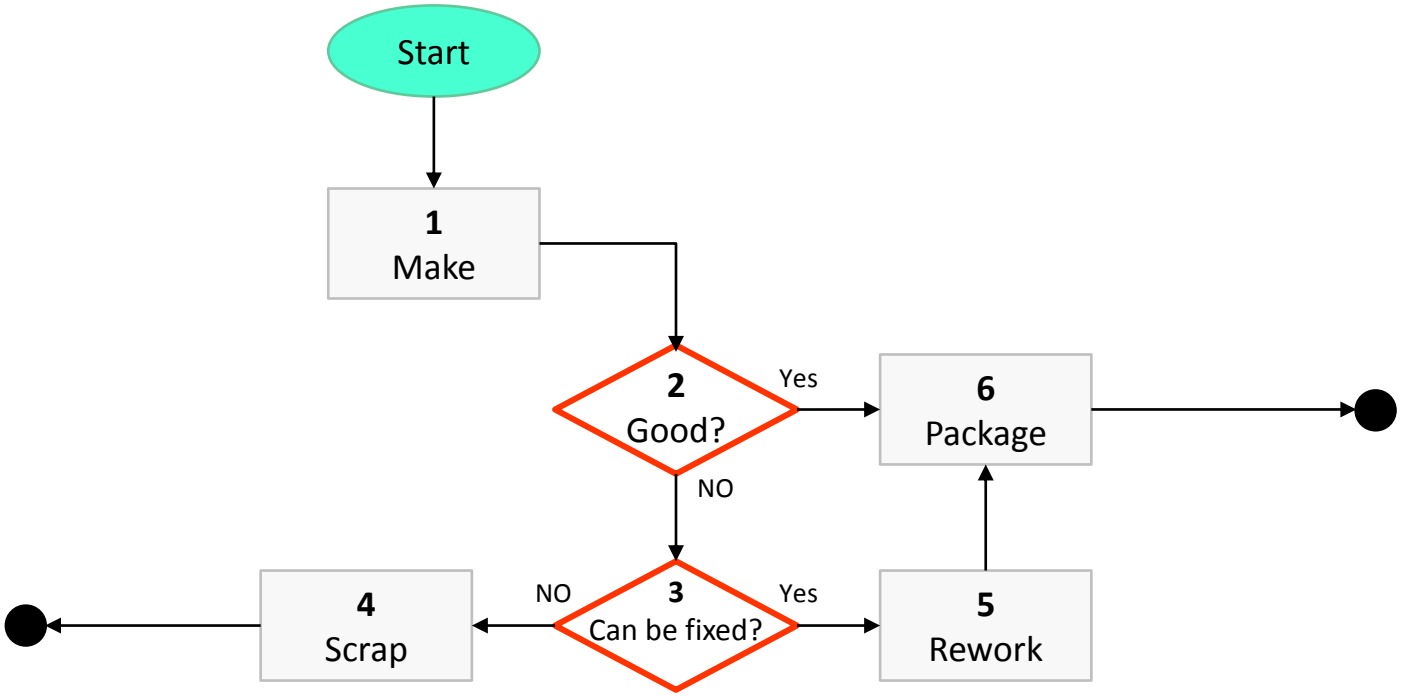
Activity Flowchart

Displays the sequence of the activities that make up the process in a way that focuses on **what** happens



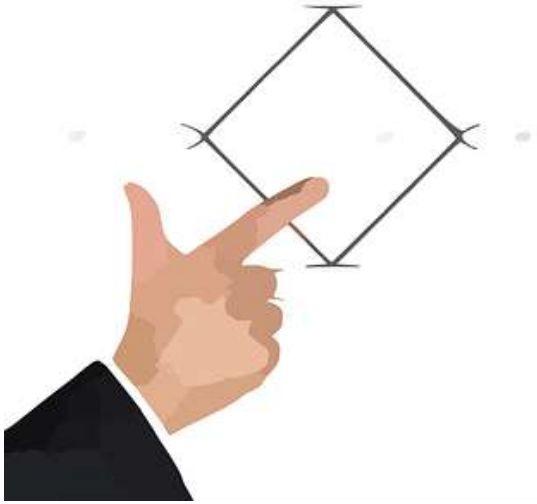
Flowcharting

Activity flowcharts are the **basic forms** of flowcharts



Flowcharting

Activity flowcharts illustrates . . .

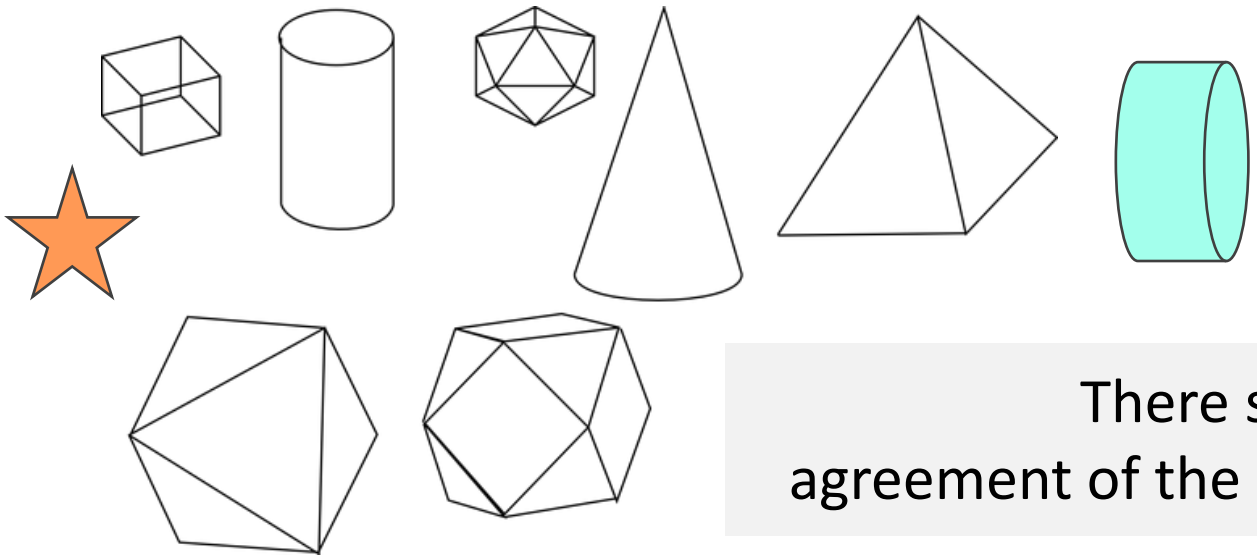


- The flow of activities
- Decision points
- Rework loops
- Overall order of the process

Flowcharting

There is no precise **format** for a flowchart

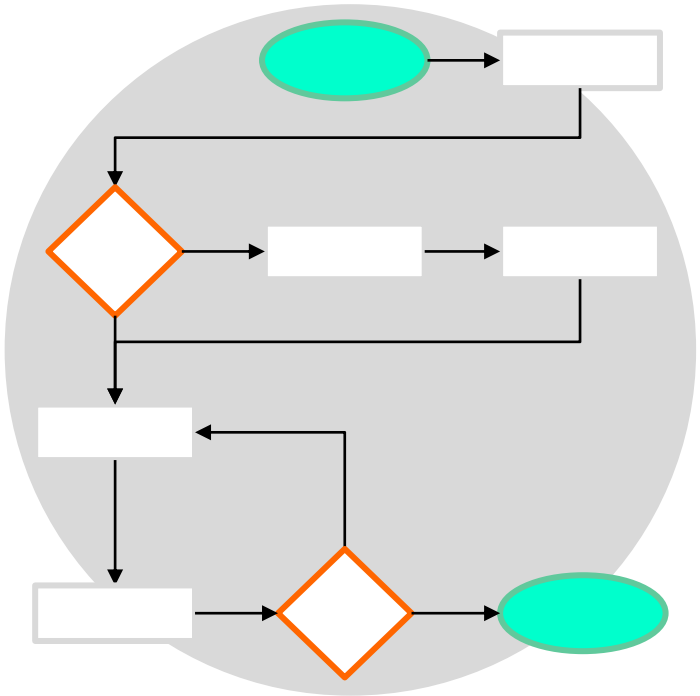
It should be drawn in a **consistent** and uniform manner



There should be an agreement of the used **shapes**

Flowcharting

Typically drawn with **arrows** and **shapes** of various kinds to represent different types of activities



Flowcharting

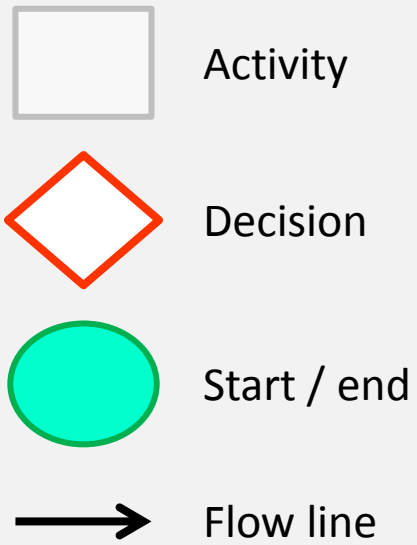
Basic Flowchart Shapes

Represents an **activity** or action

Represents a **decision** point

The **start** and the **end** of the process

Connects the shapes and shows process flow



Flowcharting

Basic Flowchart Shapes

Activity

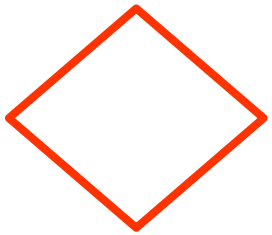
Flow line

- Denoted as a rectangular box.
- The task or action to be done.
- The most frequently used shape.

- Connects the shapes and shows the process flow.
- Can be labeled.
- Sometimes used in indicate a loop.

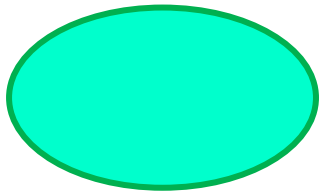
Flowcharting

Basic Flowchart Shapes



Decision point

- Requires a YES/NO response.
- Other responses are also valid such as: (TRUE/FALSE) and (<=0/>0)
- Labeled in the form of a question.
- Has 2 outgoing paths in most cases.



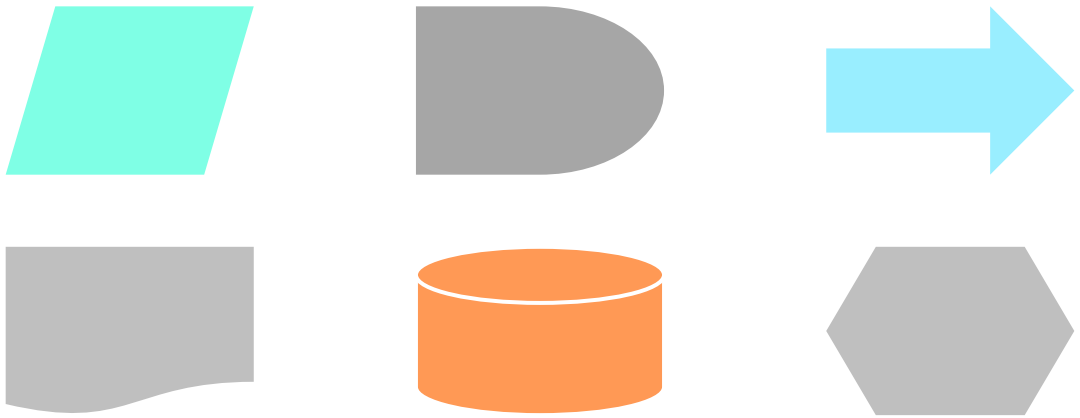
Start / end

- Defines the process boundaries.
- There should be 1 start and 1 end.
- Also used to indicate that a branch from a decision comes to an end (use STOP).

Flowcharting

Other Shapes

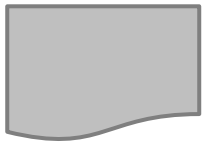
Can be used to describe the **type of activities** more specifically



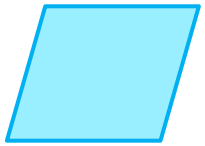
Keep things **simple** to gain people's understanding

Flowcharting

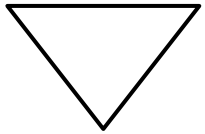
Other Shapes



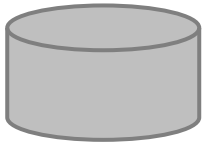
Document



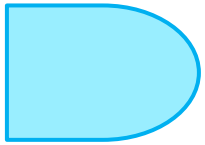
Input/output



File

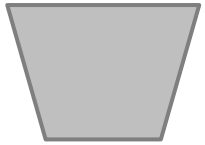


Database



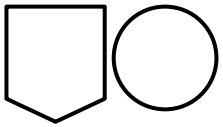
Delay

Terminal point



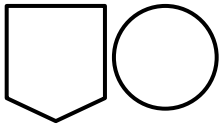
Manual activity

Card



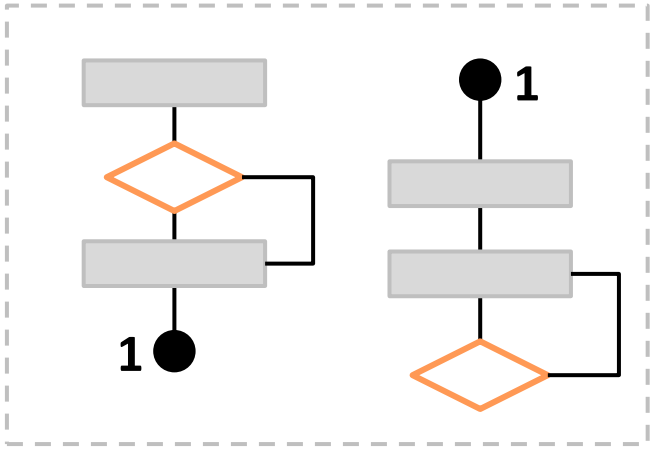
Connectors

Flowcharting

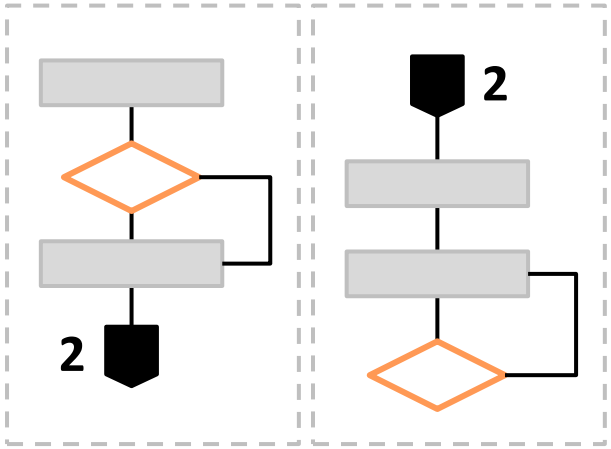


Connectors

Flowcharts may contain **connectors** to link sub-processes or to represent converging paths (in nested flowcharts)



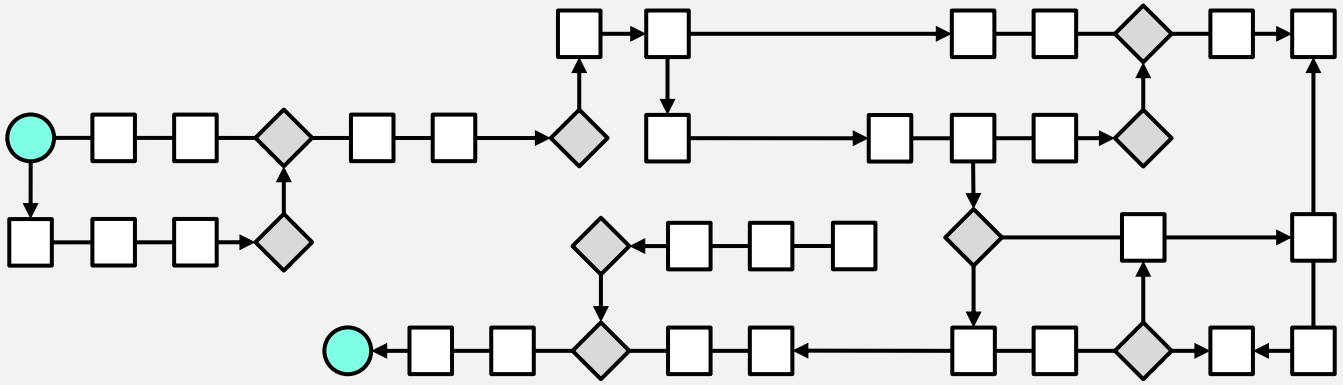
Same page



Multiple pages

Flowcharting

A single flowchart can quickly becomes **long and complicated**



You may need to represent everything in **more than one page**

Flowcharting

More information can be displayed in flowcharts . . .

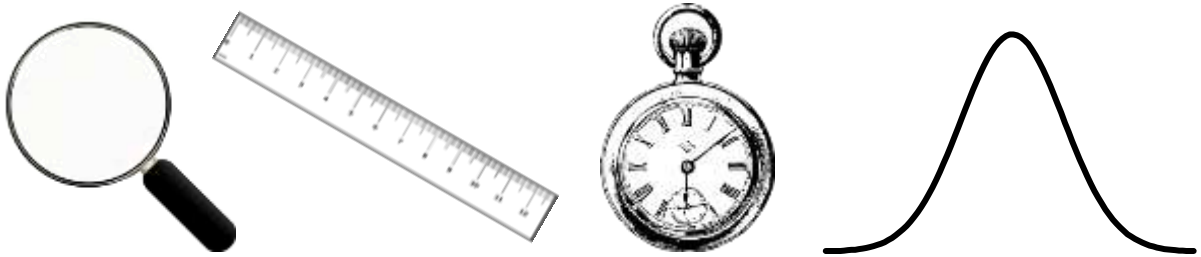
The **time** it takes to perform each activity

The **responsible** person for each activity

The responsible person for each **decision**

Flowcharting

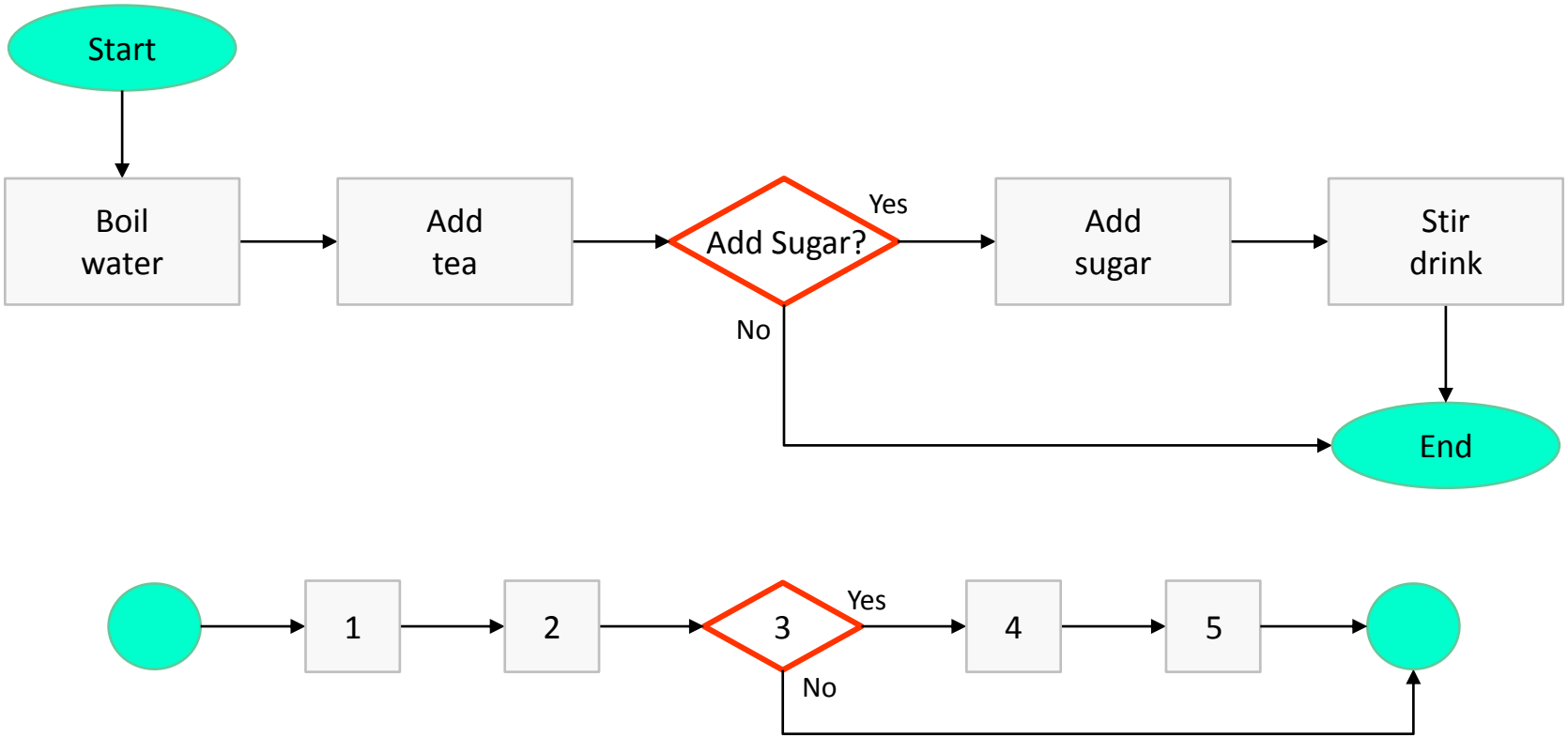
More information can be shown in the flowchart . . .



Measurement points and **KPIs**	**Data collection** points
Process control and **inspection** points	Scrap and **rework** points
Error proofing points	**Data storing** and retrieving points

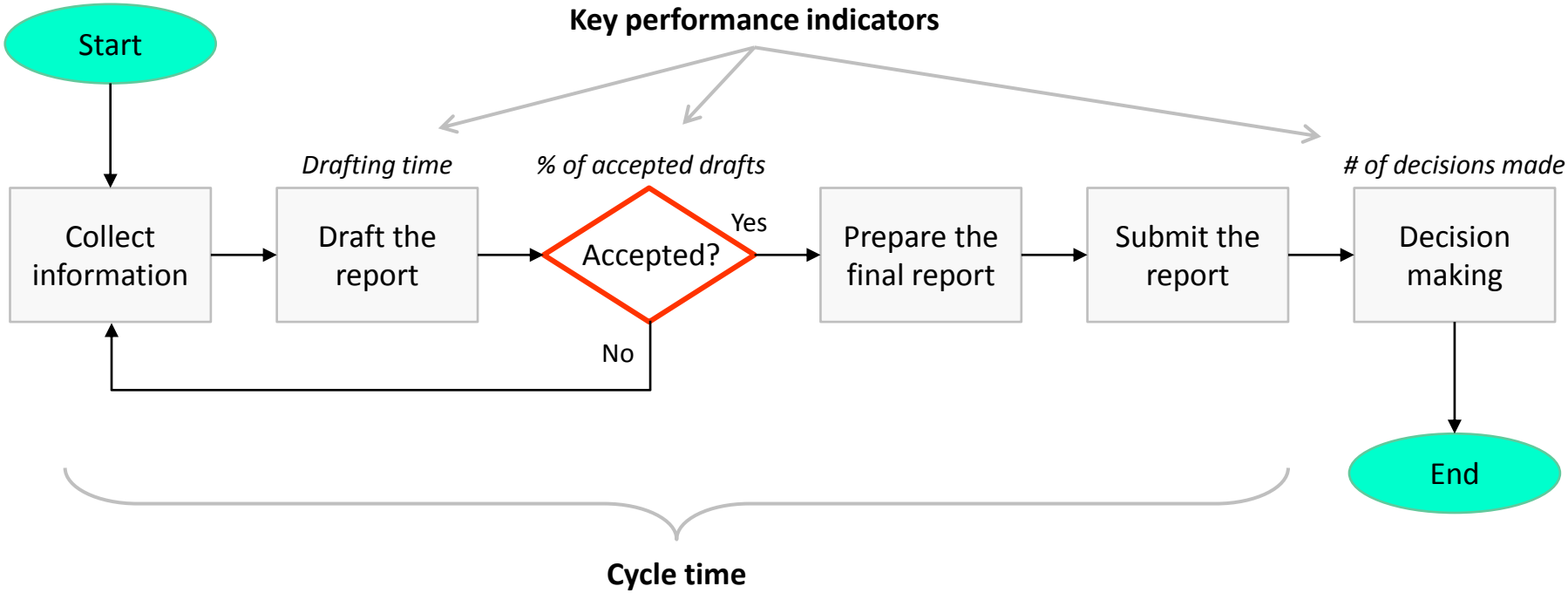
Flowcharting

Example – Making a Cup of Tea



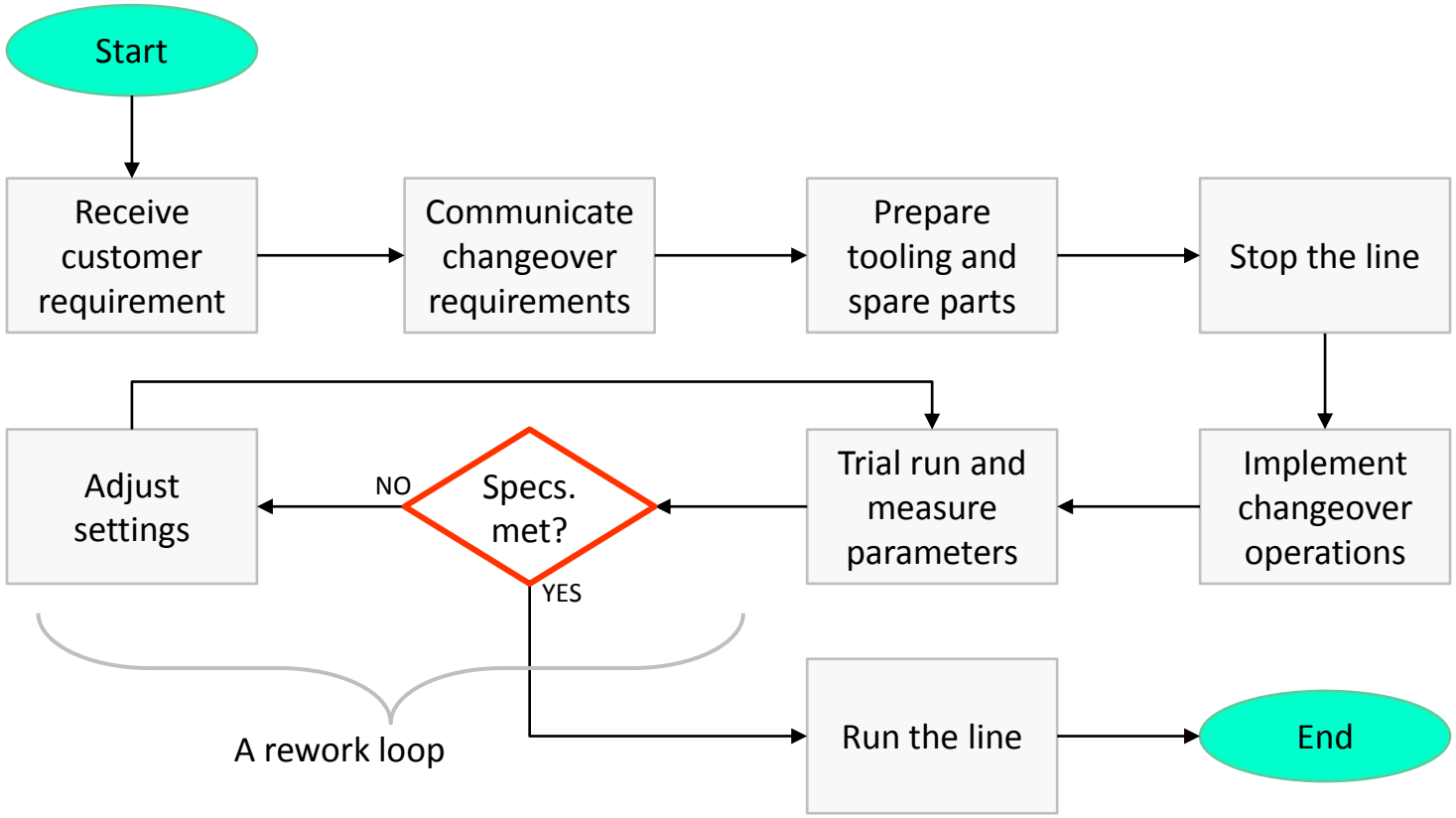
Flowcharting

Example – Preparing Reports for Decision Makers



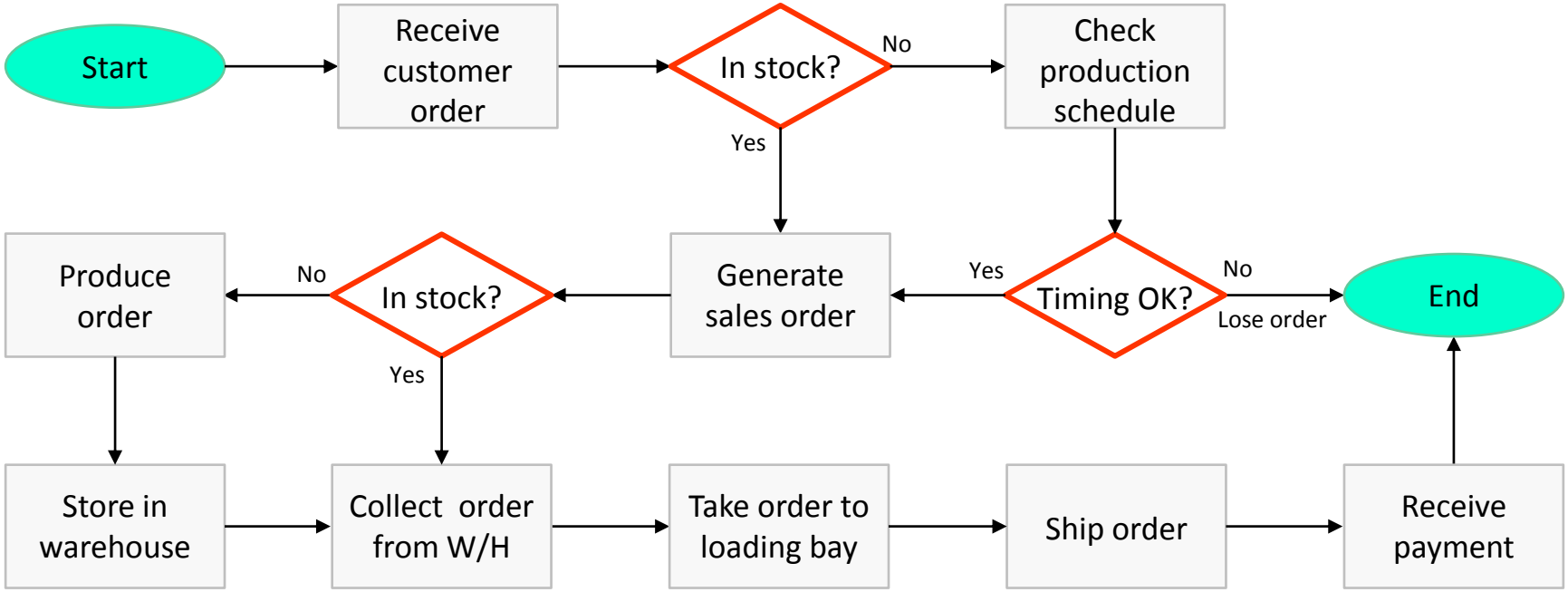
Flowcharting

Example – Changeover (Size Conversion)



Flowcharting

Example – Customer Order Processing

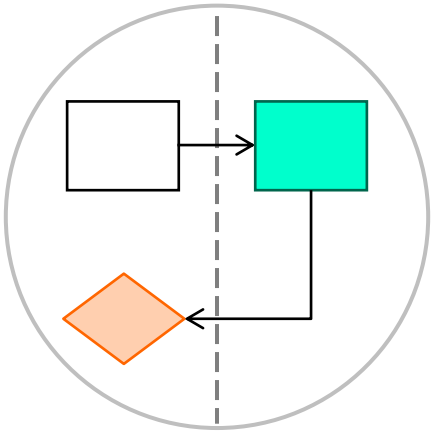


This flowchart shows the flow of **material** as well as the flow of **information**

Flowcharting

Swimlane Flowchart

A flowchart that illustrates the sequence of activities required to accomplish a **cross-functional** process

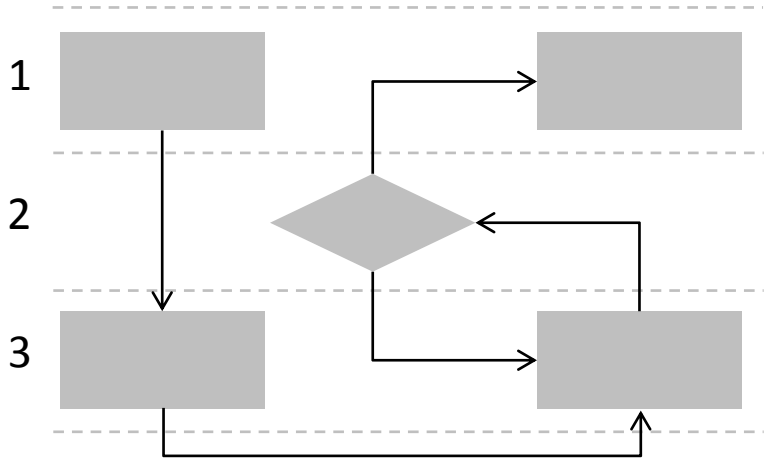


Also called **deployment** flowchart or **cross-functional** flowchart

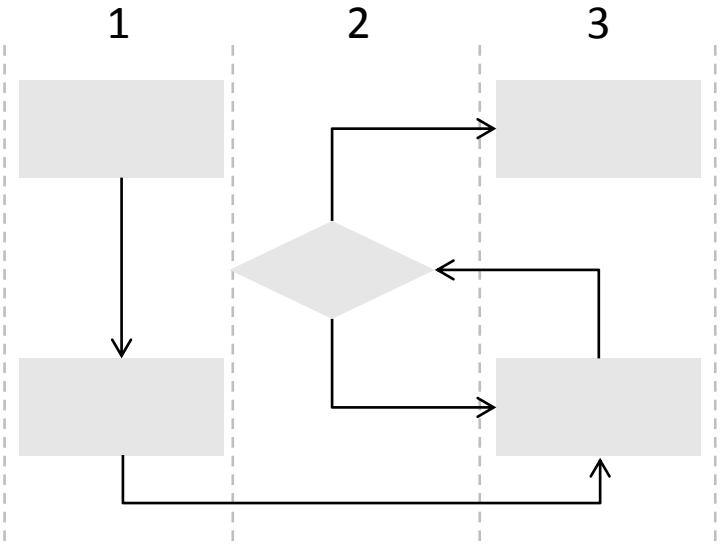
Flowcharting

Swimlane Flowchart

This type of flowchart is divided into multiple **lanes**



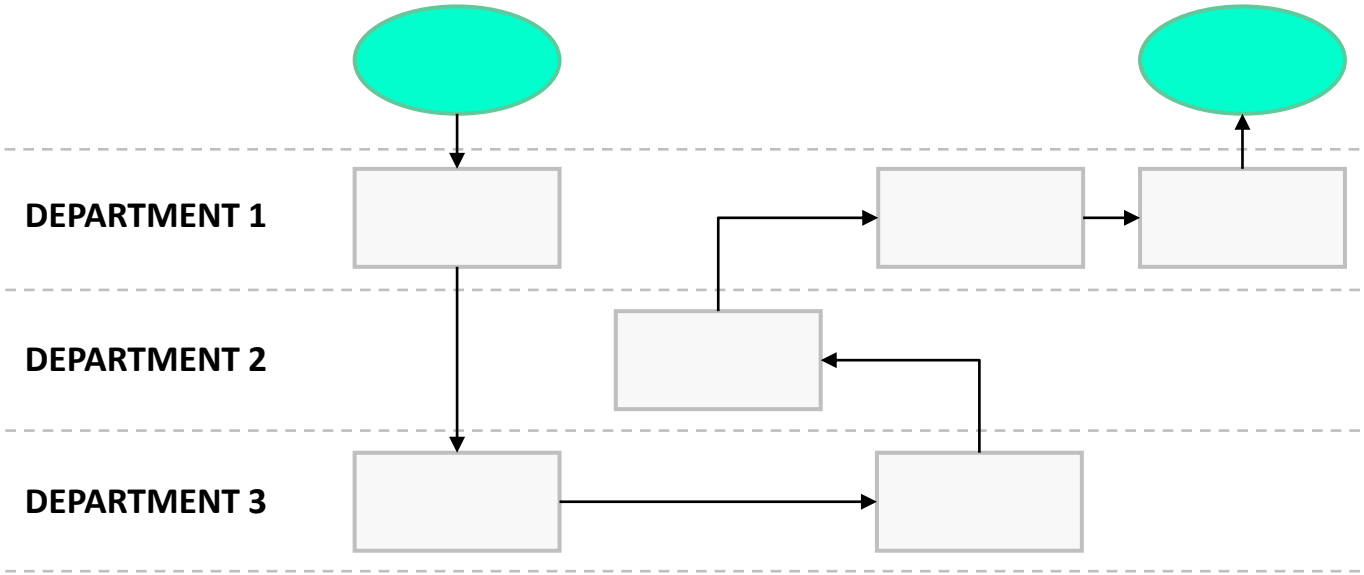
Horizontal lanes



Vertical lanes

Flowcharting

Used when the process involves **several departments**



Divides the chart into different **lines of responsibilities**

Flowcharting

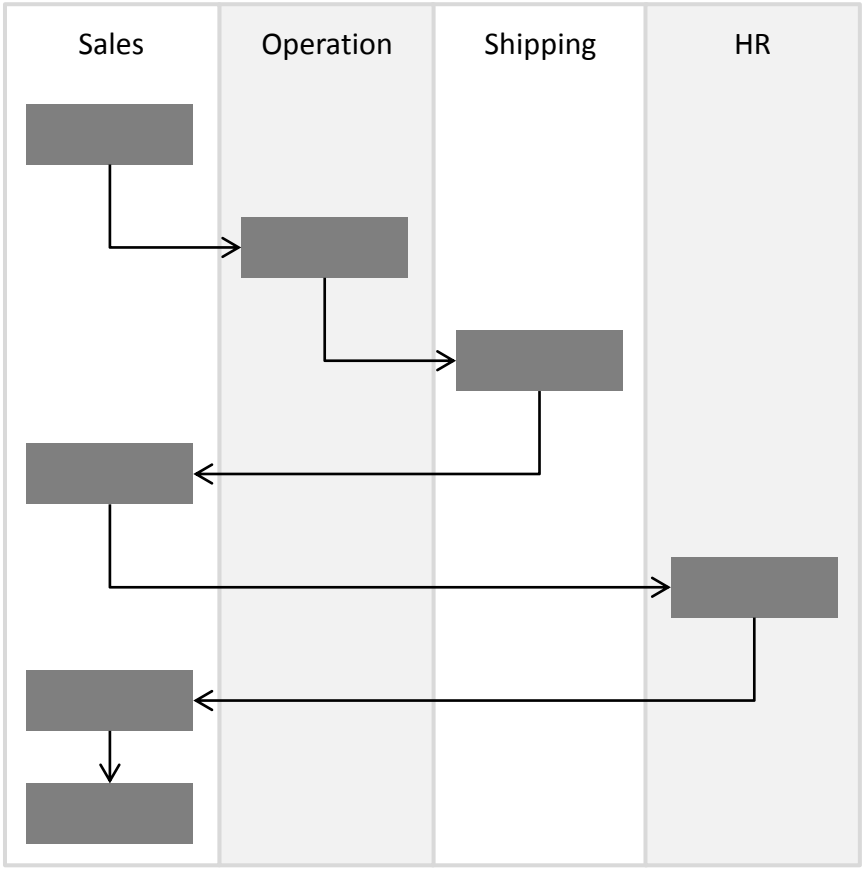
Swimlane flowcharts shows:

What

- The flow of activities
- Decision points
- Rework loops
- Overall order of the process

Who is handling or doing the work

Flowcharting



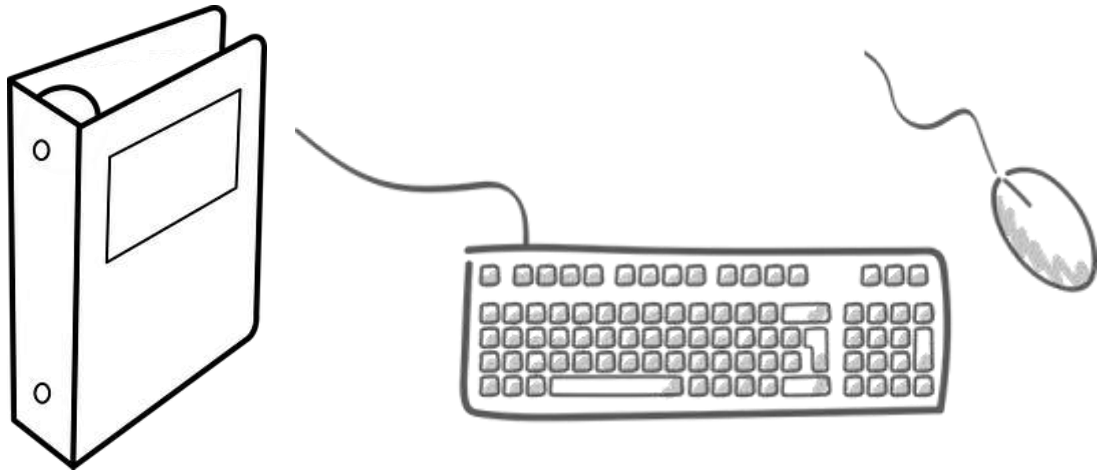
This type of flowchart is ideal for showing the **control** of the different departments on each process activity

It clarifies the **responsibility** for performing an activity or making a decision

You may have **only one** department or person responsible for any activity, but yet have many performers

Flowcharting

Particularly helpful for **non-manufacturing processes** which mainly involve the flow of information, knowledge, and documents between people and departments



Flowcharting

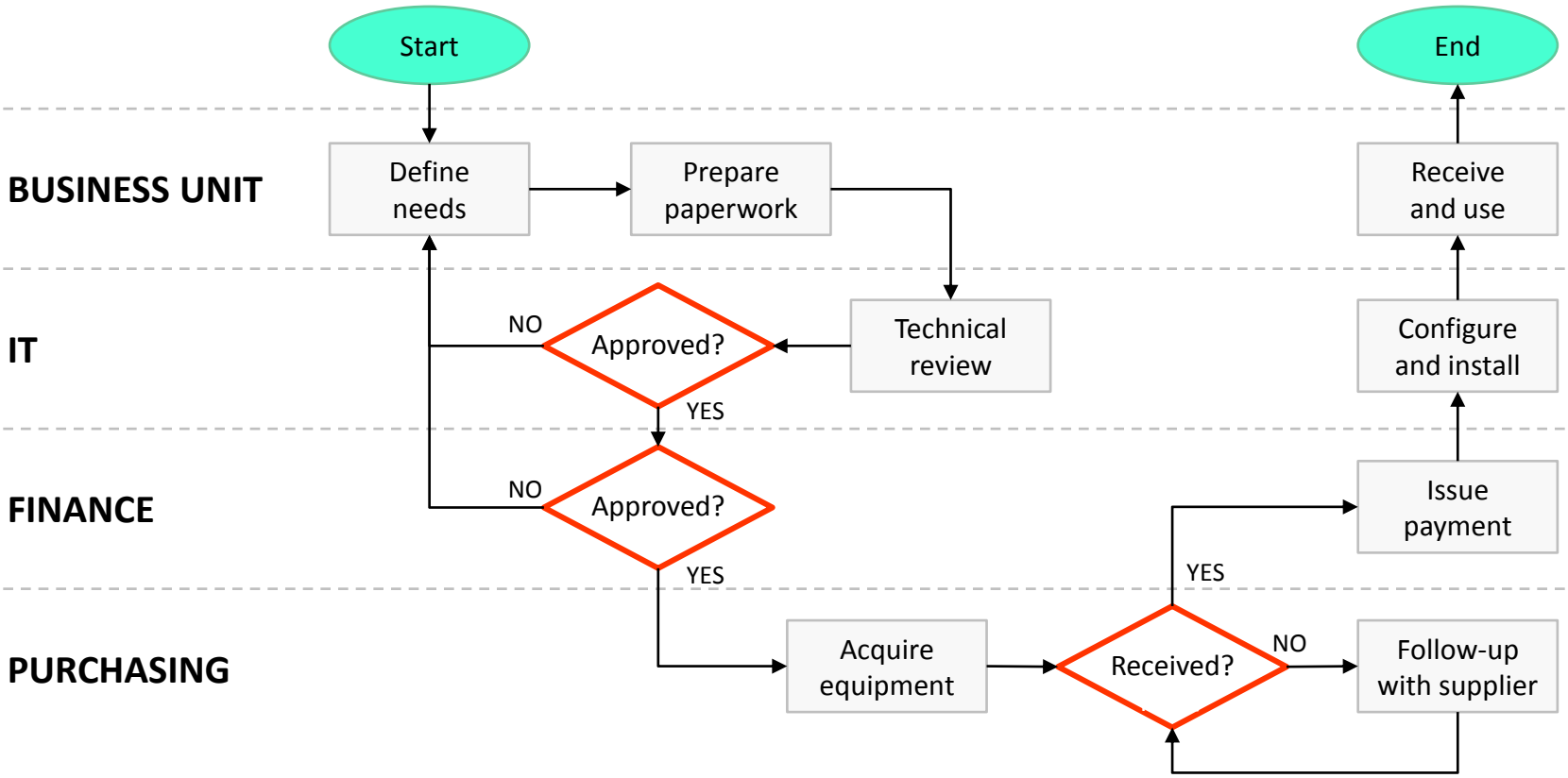
Useful in processes with many **handoffs**, where information and documents are passed back and forth among departments

Helps highlighting the **handoff areas** that are causing disagreements

When a swimlane flowchart shows a lot of hand offs, this maybe a sign for having **waste** due to transporting, motion or overprocessing

Flowcharting

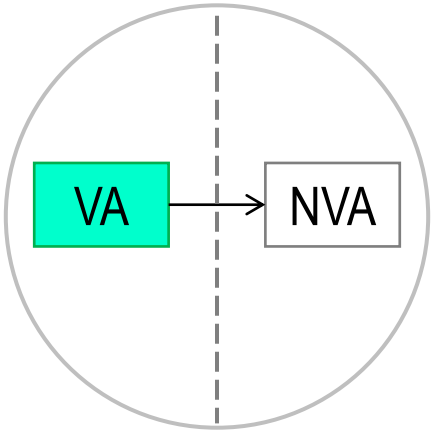
Example – Acquiring New Equipment



Flowcharting

Opportunity Flowchart

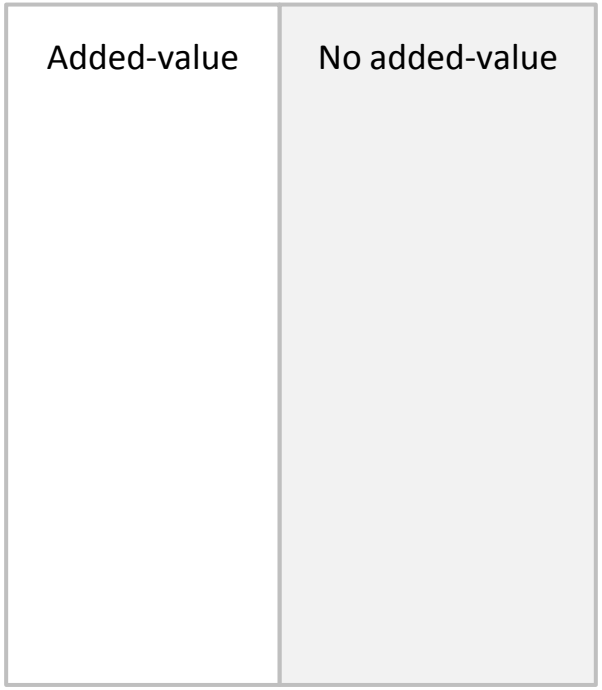
A flowchart that provides a way to analyze and study business processes by highlighting the steps that **add waste and complexity** to the process



Flowcharting

Opportunity Flowchart

Divides the chart into **two sections** to differentiate the activities and decisions in the process that add value from those that don't



Flowcharting

Value-added

- Customers are willing to pay for them.
- They physically changes the product.
- They are done right the first time.
- Include machining a part and serving a customer.

Essential non-value-added

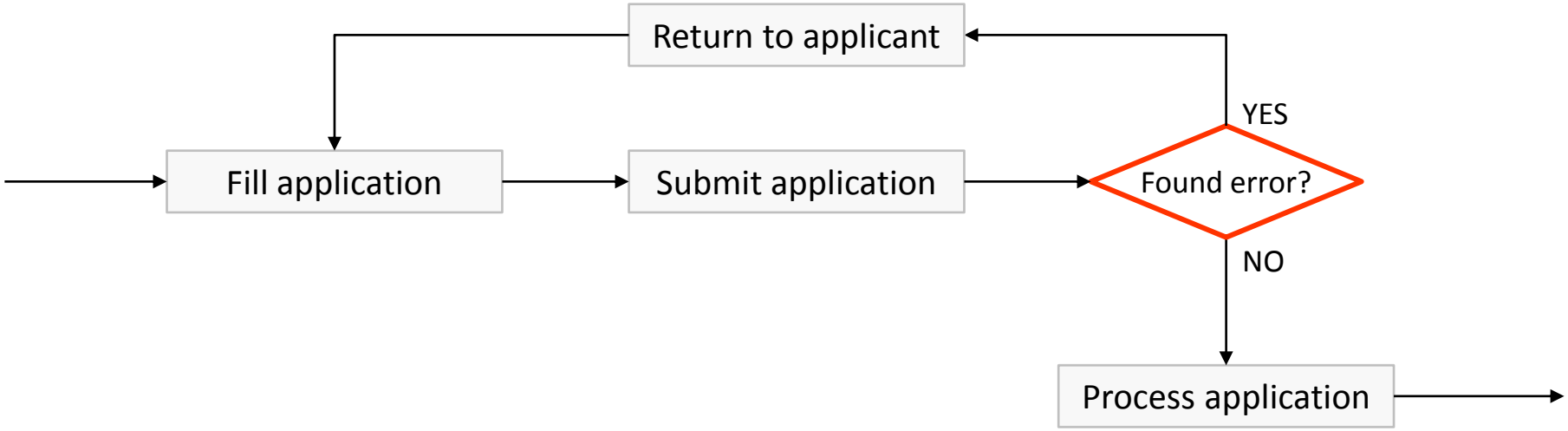
- Add no value and the customer is not willing to pay for them.
- They are necessary for the business due to the current settings of the process.
- Include inspection and prevention activities.

Horizontal lanes

- Not essential to produce output.
- Do not add value to the output.
- Include defects, errors, waiting, transport, inventory, unnecessary processing, etc.

Flowcharting

Reveals **opportunities for improvement** as it will increase the awareness of what previously was accepted as normal and unavoidable waste



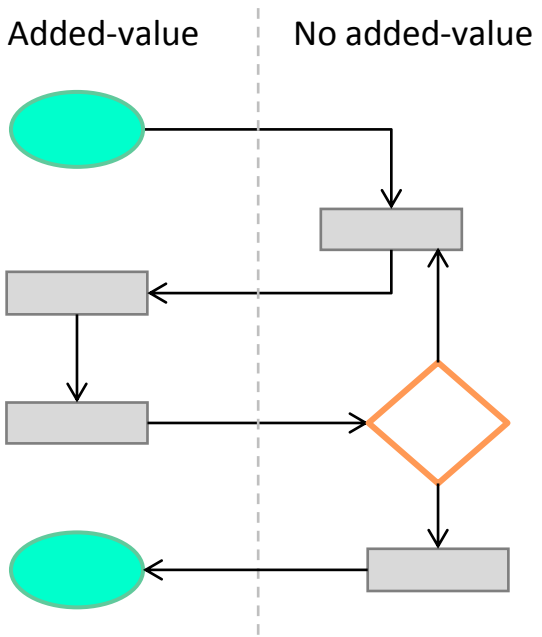
Flowcharting

Time will normally flows down the page

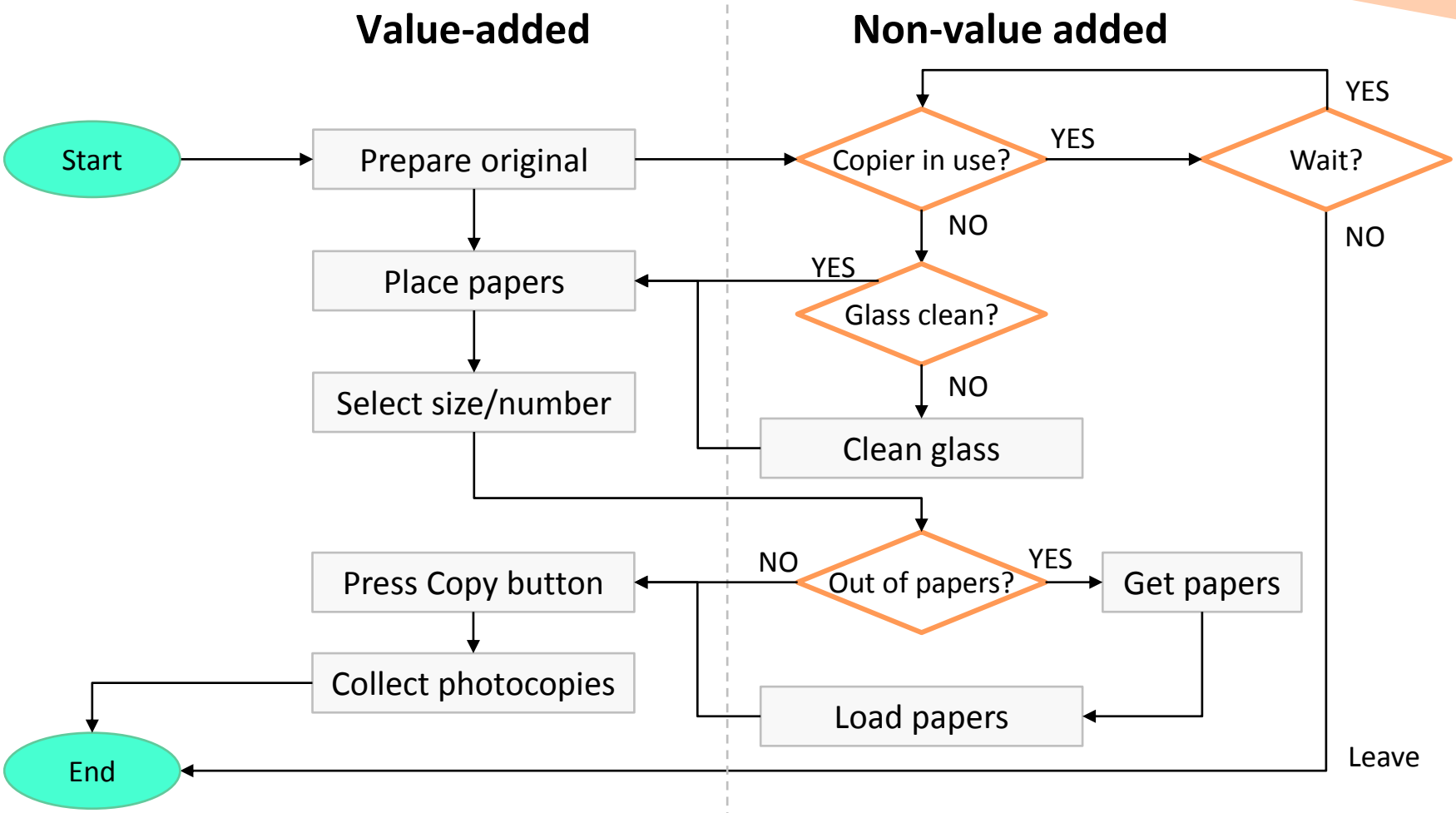
If there are only value-added activities, the process will be simple and **straightforward**

If the errors could be reduced or prevented, there is a great chance to simplify and streamline the process

When charting the **present process**, the value-added section is often smaller in size



Flowcharting



Flowcharting

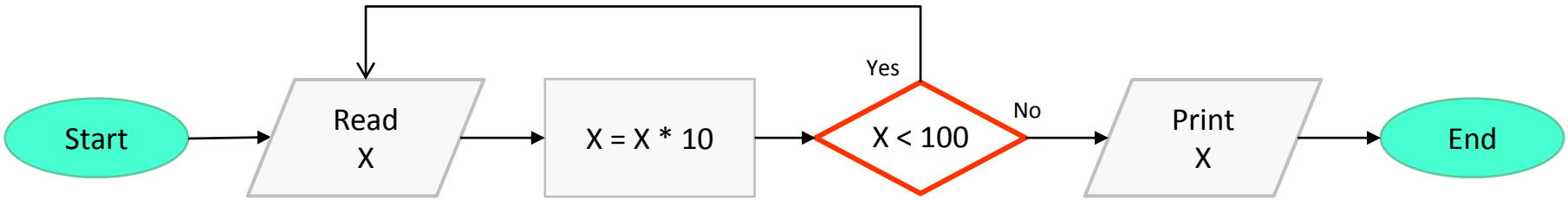
Industry Specific Flowchart

Flowcharts are widely used in software development, quality management and auditing practices

Flowcharting

Industry Specific Flowchart

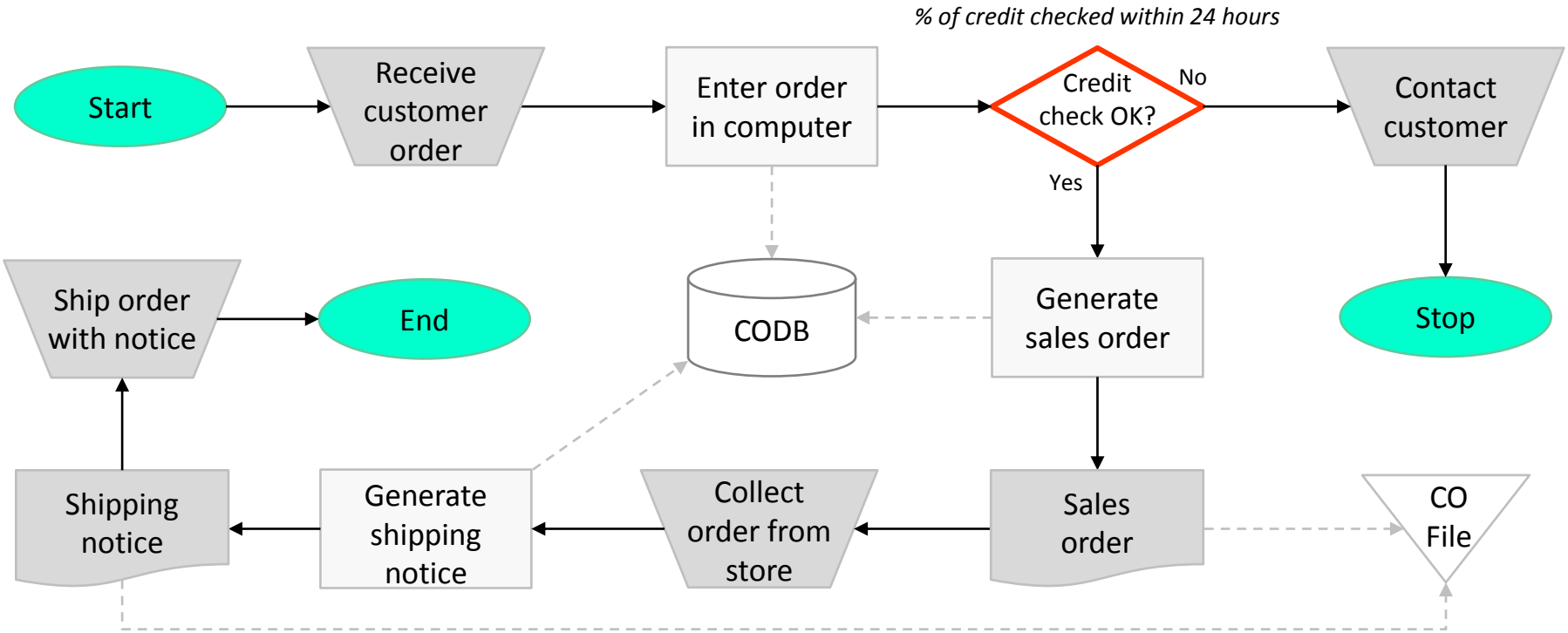
Flowcharts are used as means for describing **computer algorithms**



They help in **designing** and **documenting** computer programs

Flowcharting

Example – Customer Order Processing



This flowchart shows the flow of **material** as well as the flow of **information**

Flowcharting

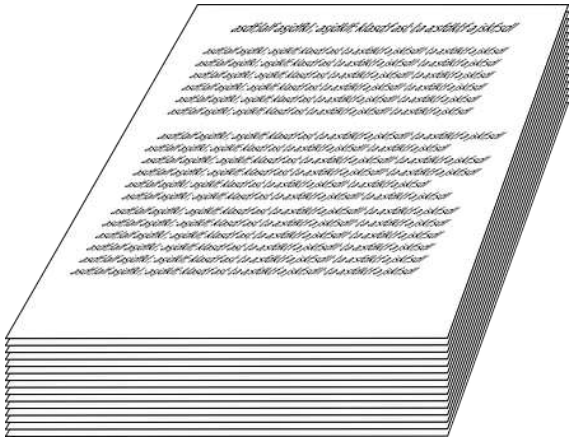
Document Management and Flowcharts

Companies often **document their procedures** and processes to comply with regulations in their industry and to meet the continuous auditing needs of customers

Flowcharting

Document Management and Flowcharts

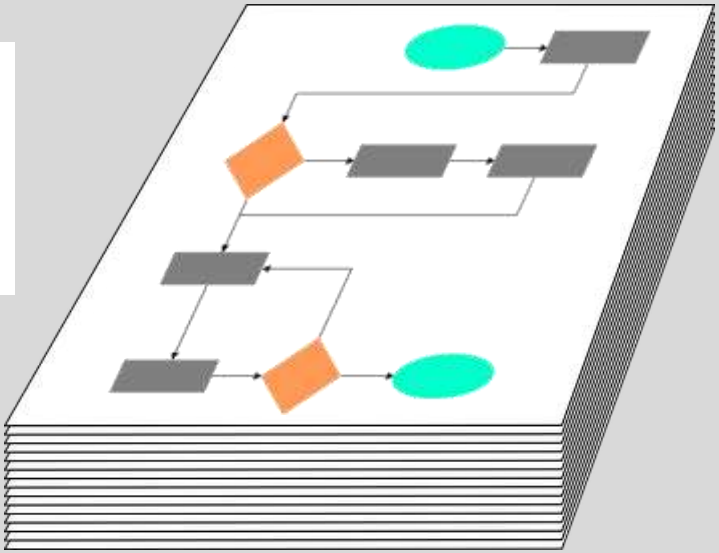
Every company should have **a standardized way** for documenting their procedures and processes.



Flowcharting

Flowcharts are useful **to summarize** the procedure or process

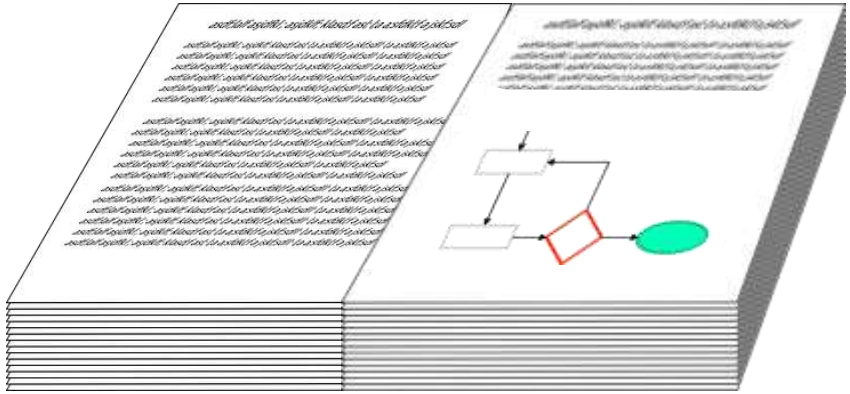
They provide a **common language** & understanding of the process or procedure

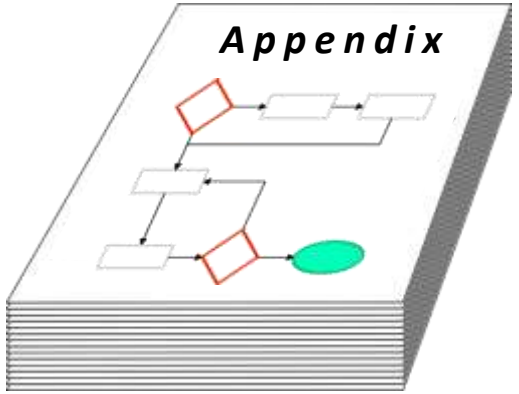


They can highlight issues and reveal **opportunities** to improve the process or procedure

Flowcharting

They can either be included under the relevant procedure, or be placed in the **appendix** at the end of the documentation or manual





Flowcharting

It is often best to **start with** a flowchart when documenting a procedure, and then document the necessary steps to supplement the flowchart

Flowcharting

How to Construct a Flowchart

With your team, **describe the process** and your objectives

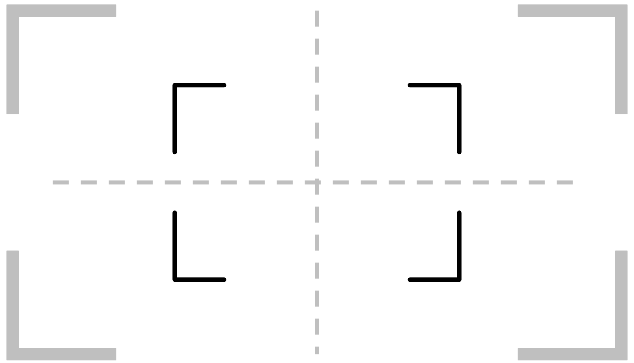
Working in a team will help get multiple viewpoints!

Flowcharting

How to Construct a Flowchart

Determine the type of flowchart, the **level of detail**, and the appropriate scope and boundaries

If the decision is to create a swimlane flowchart, work with your team to agree on what departments should be included

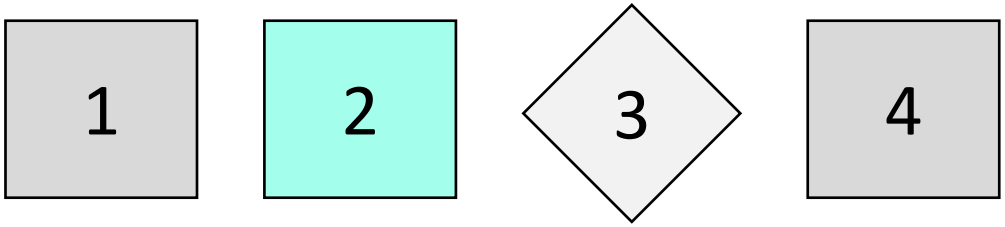


Flowcharting

How to Construct a Flowchart

Identify all major **process activities**, decisions and the sequence of completion

Brainstorm activities and decisions, and write these on sticky notes or on a flipchart

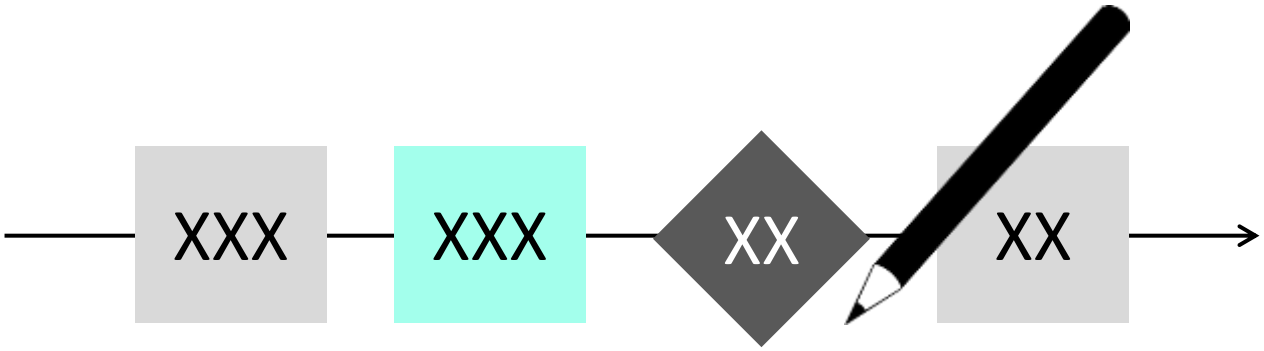


Flowcharting

How to Construct a Flowchart

Draft the flowchart using the standard set of shapes, and **label each step** appropriately

Be consistent in the direction of flow (time may flow from top to bottom and from left to right)

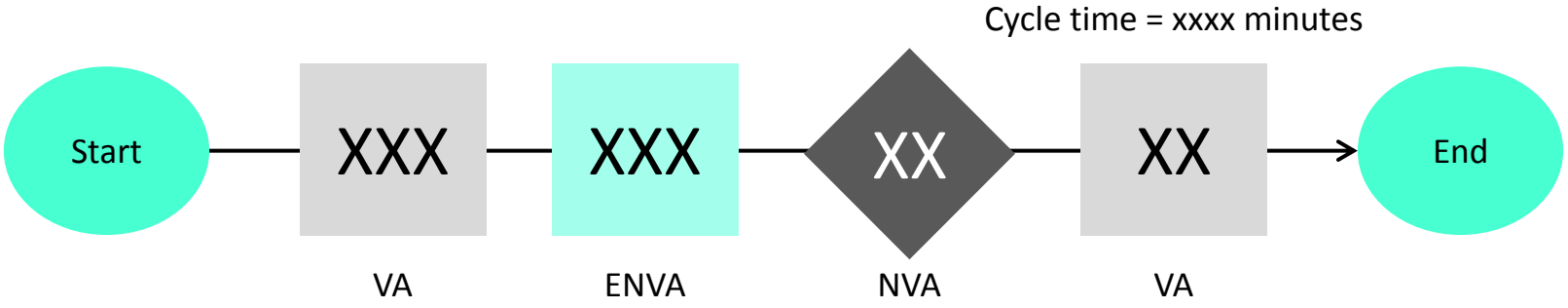


Flowcharting

How to Construct a Flowchart

Prepare the final flowchart, check for missing steps or decisions, and **add further details** as necessary

Test the flowchart to make sure that it represents the process accurately and completely

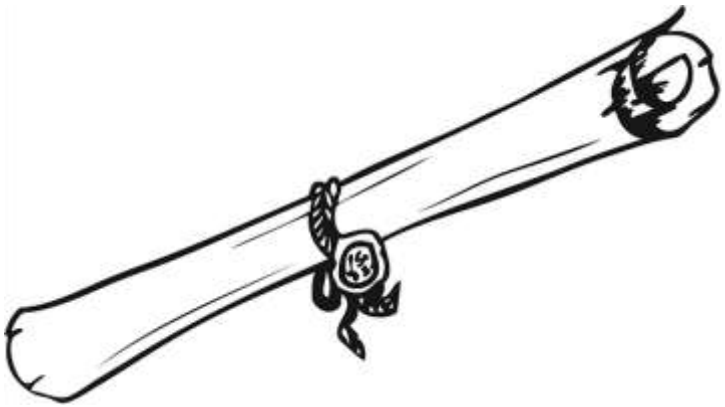


Flowcharting

How to Construct a Flowchart

Publish and **distribute** the completed final version of the flowchart to all concerned

Update the procedures as necessary

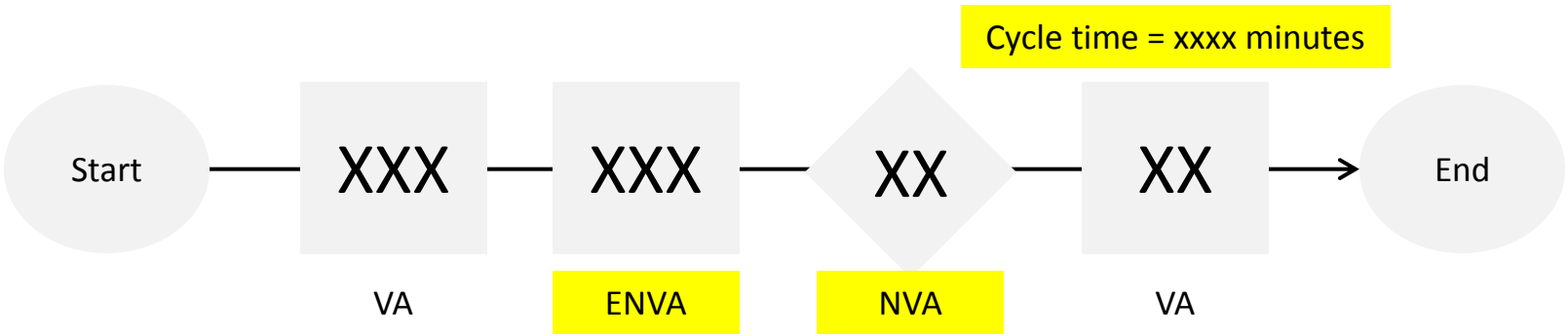


Flowcharting

How to Construct a Flowchart

Identify the areas that hinder the process or add little or no value for further **process improvement**

Plan and implement actions to reduce inefficiencies and waste

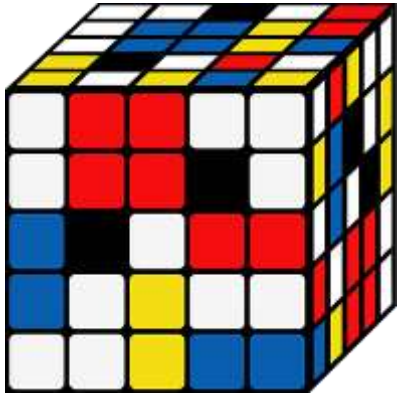


Flowcharting

Software Applications and Online Services

The process of drawing a flowchart can be an **overwhelming** task

This is where **applications** and online services can offer the flexibility that a piece of paper can't



Flowcharting

Although you can draw flowcharts by hand, it's often more convenient to use any of the drawing applications to create **visually appealing flowcharts**

A good practice is to **draft the flowchart** on a paper before designing it with software

Flowcharting

There are many **software applications** and **online services** that allow the creation of flowcharts

Microsoft Visio

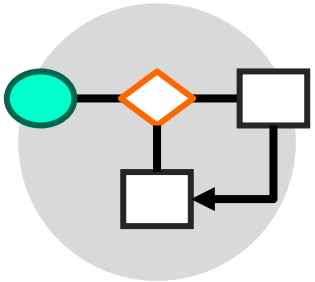
SmartDraw

MICROGRAFX®

Flowcharting

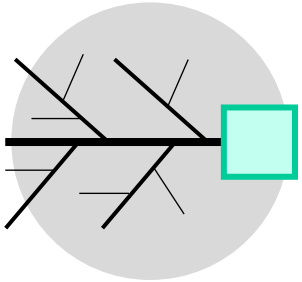
Further Information

Flowchart is one of the **seven basic tools of quality**

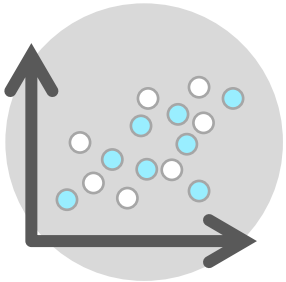


Flow chart

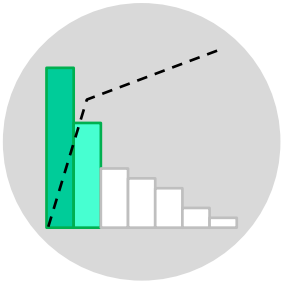
Histogram



Fishbone diagram



Scatter diagram



Pareto chart

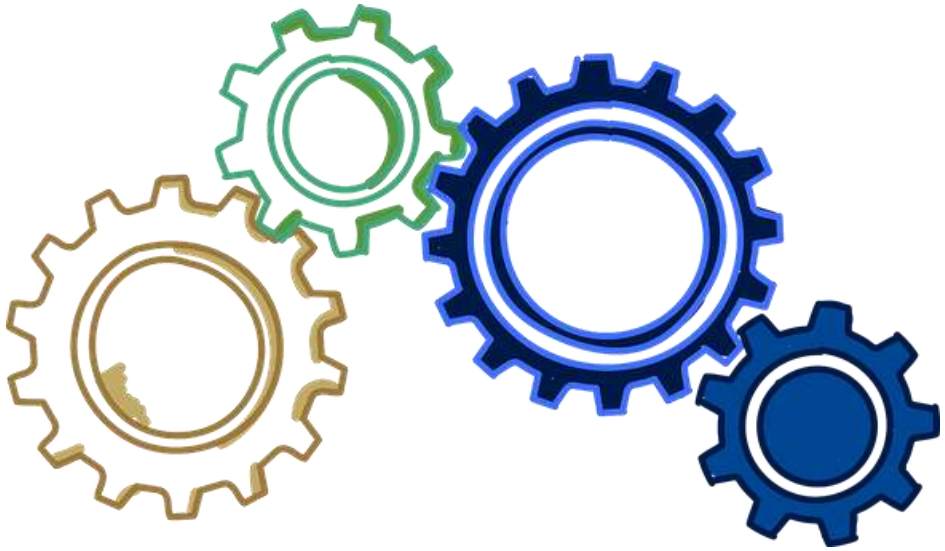
Run chart

Check sheet

Flowcharting

Further Information

If several people are going to chart the processes, design a **template** to ensure that one language is being spoken

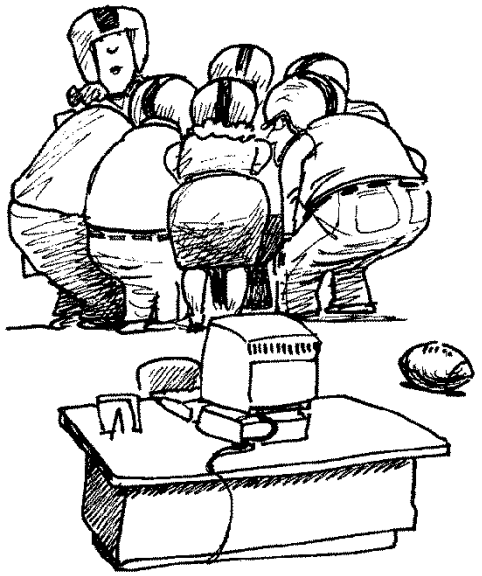


Flowcharting

Further Information

The exercise of flowcharting your company processes can clarify your and your team's **understanding of the work**

It's always recommended to **walk the process** before you draw your flowchart to get an overview of the process and identify the boundaries



Flowcharting

Further Information – **Flowcharting Tips**

Clarify process boundaries	Specify only one result for each activity
Use brief description to describe each activity	Whenever possible start with verbs

Flowcharting

Further Information - Potential Pitfalls

- Mapping without a clear purpose
- Lost in the details
- Hidden bias or agenda
- Not verifying the facts
- Not focusing on customers' needs

Flowcharting

Further Information - Questions to consider:

Where does the material or service come from?

Where does the service or material of this activity go?

How do you assess the performance of this activity?

What happens if the activity is under performing?

Who makes this decision?

What happens if the decision is yes / no?

Flowcharting

Further Information - Common Process Problems

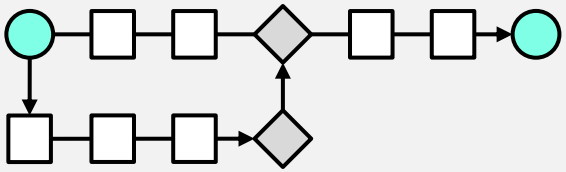
Non-value adding steps	Errors and rework	Duplication
Bottlenecks	Long cycle times	Excessive delays
Missing steps	Too many inspections	Complex procedures
Departure from procedure	Dead ends	Costly steps

Flowcharting

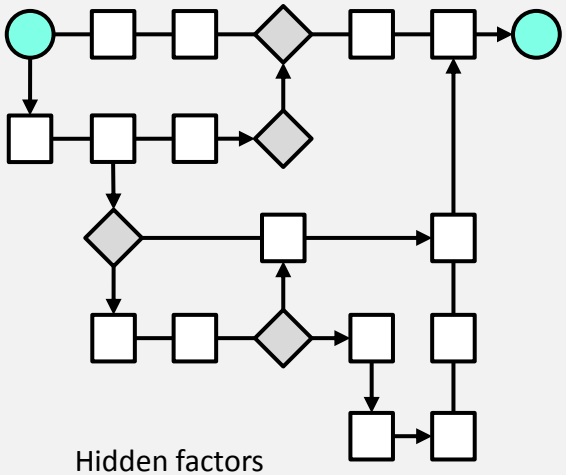
Further Information

What do we think of a process is not necessary what it actually is . . .

What you think it is



What it actually is



Hidden factors

What you would like it to be