

# Lean Six Sigma Green Belt Certification Course

DIGITAL  
OPERATIONS





## Process Analysis and Documentation



# Learning Objectives

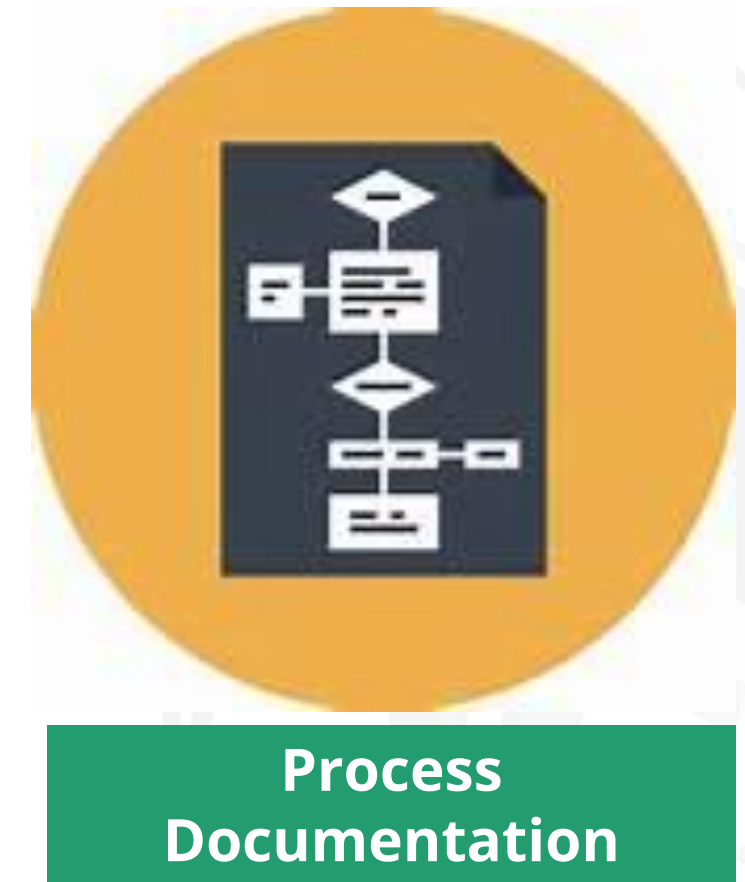
By the end of this lesson, you will be able to:

- Process maps
- Development of Process maps
- Written procedures and work instructions



# Introduction

A picture speaks a thousand words

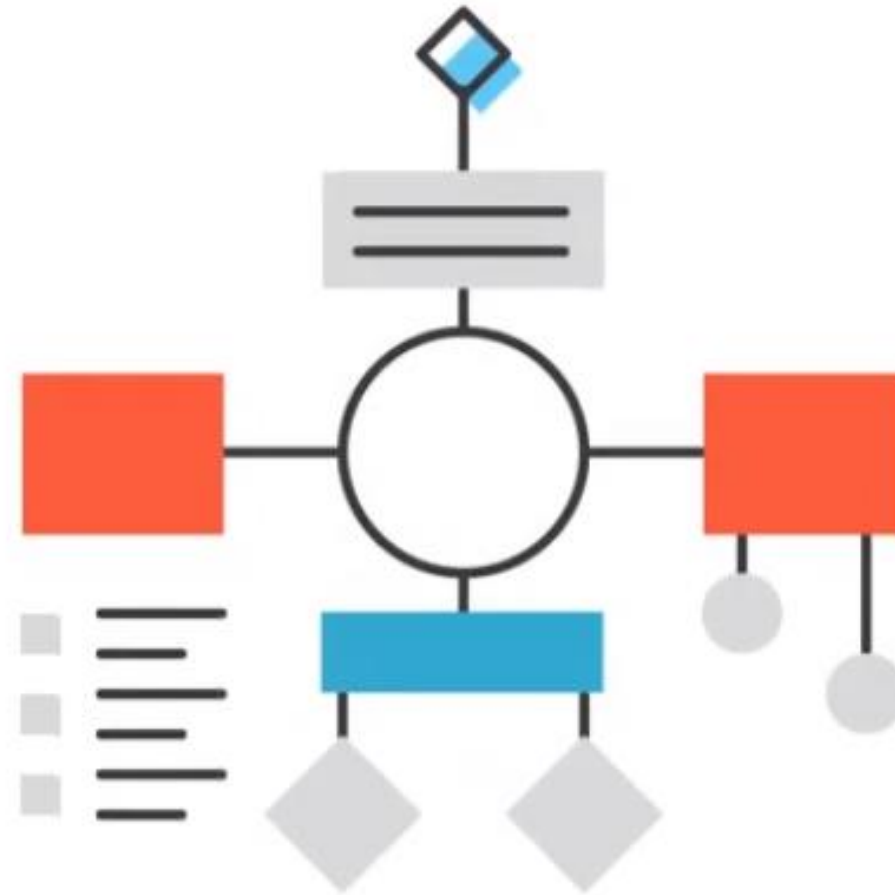




## Process Maps, Flowcharts, Written Procedures, and Work Instructions

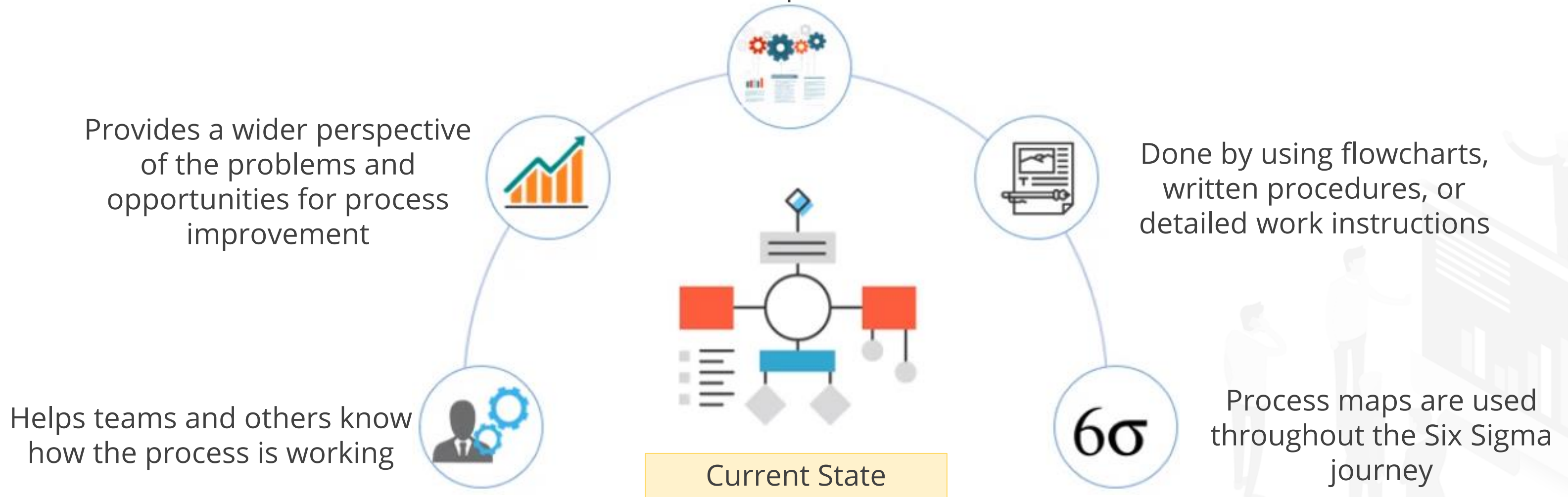
# Process Mapping

Process mapping is a graphical representation of a process.



# Process Mapping: Features

Is a systematic way of recording all activities performed



Map the process for what it truly is and not what you or your team think it should be.

# Process Mapping

Process mapping is a five-step process.

1. Identify the process and I/O at a high level.

2. Identify the major process steps going a little lower level in the process than step 1.

3. List Key Measures for each major step identified in step 2.

4. List key input variables.

5. Classify inputs as either controllable or non-controllable.



# Process Mapping: Example

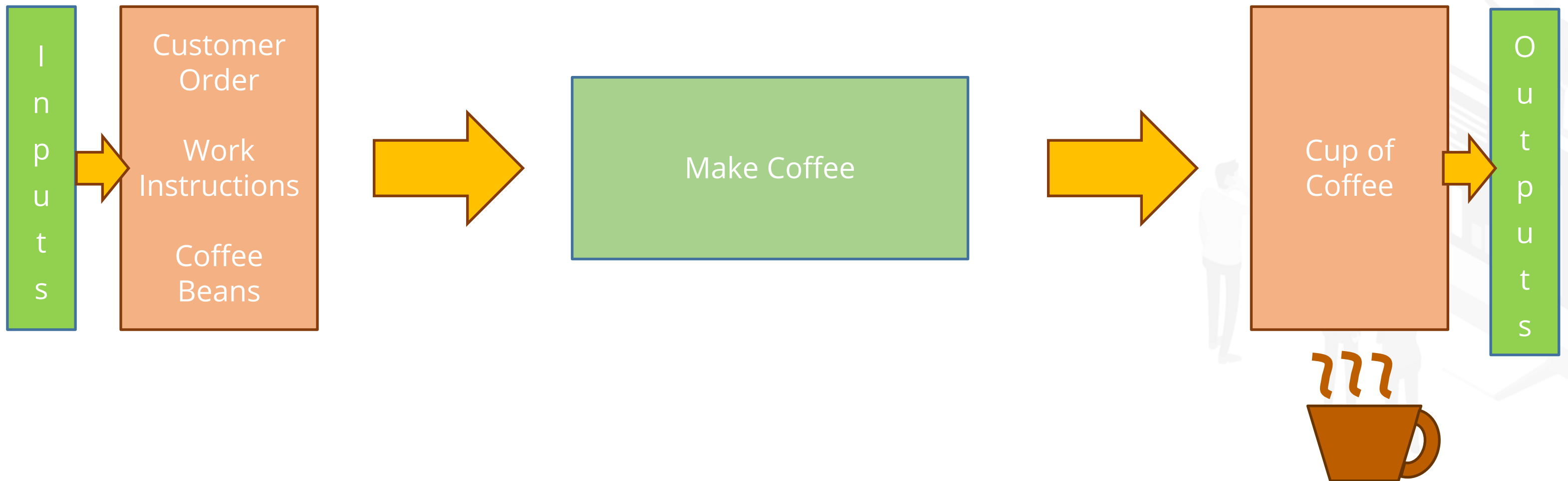
Java House Coffee has a process for customers to call in an order and then pick it up at the front counter.

Let's map the process for Java House using the 5-step approach.



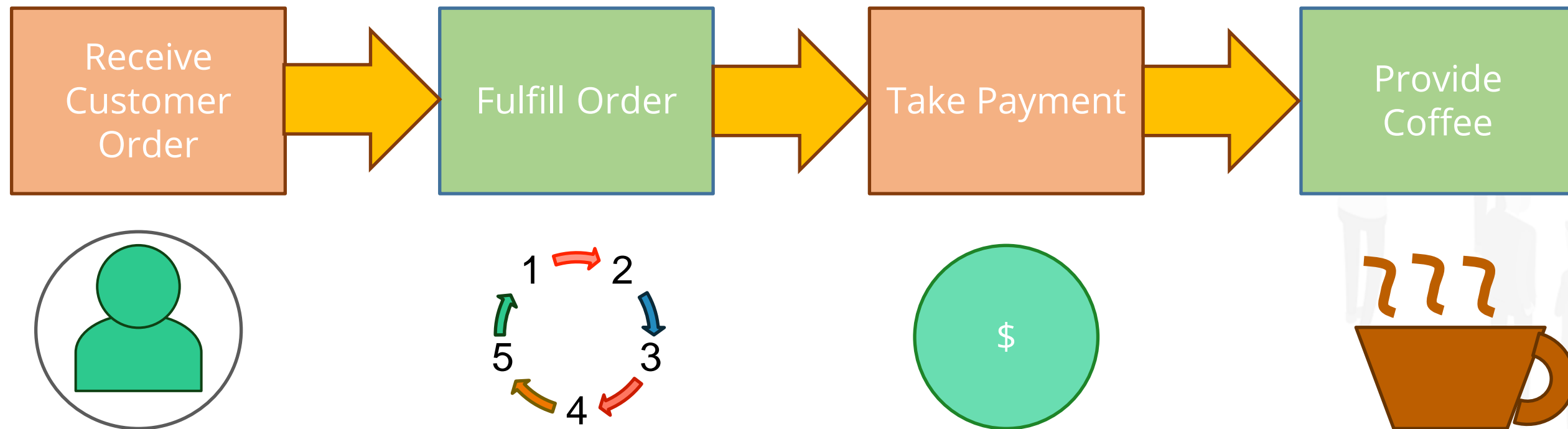
# Process Mapping: Example

1. Identify the process and I/O at a high level



# Process Mapping: Example

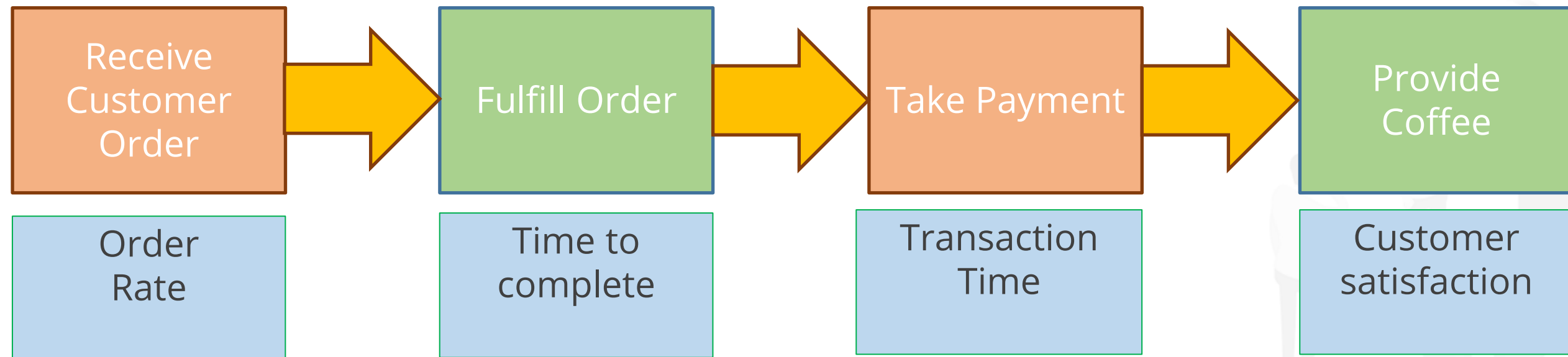
2. Identify the major process steps going a little lower level than step 1





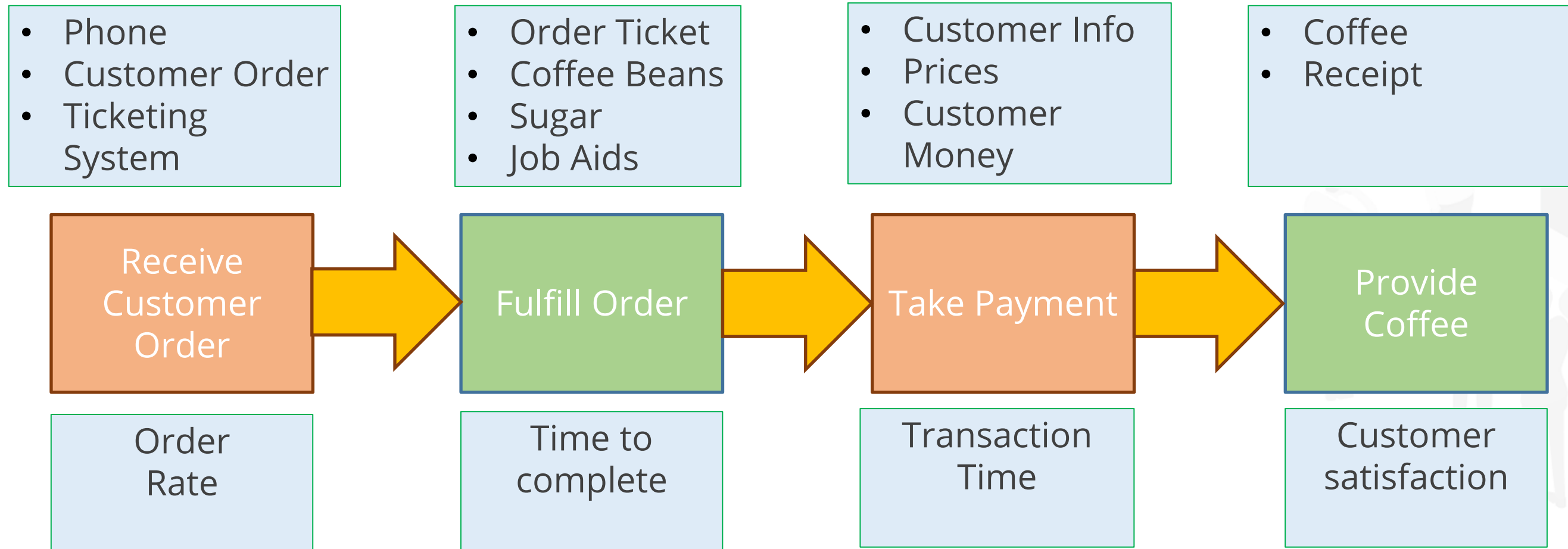
# Process Mapping: Example

3. List Key Measures for each major step identified in step 2.



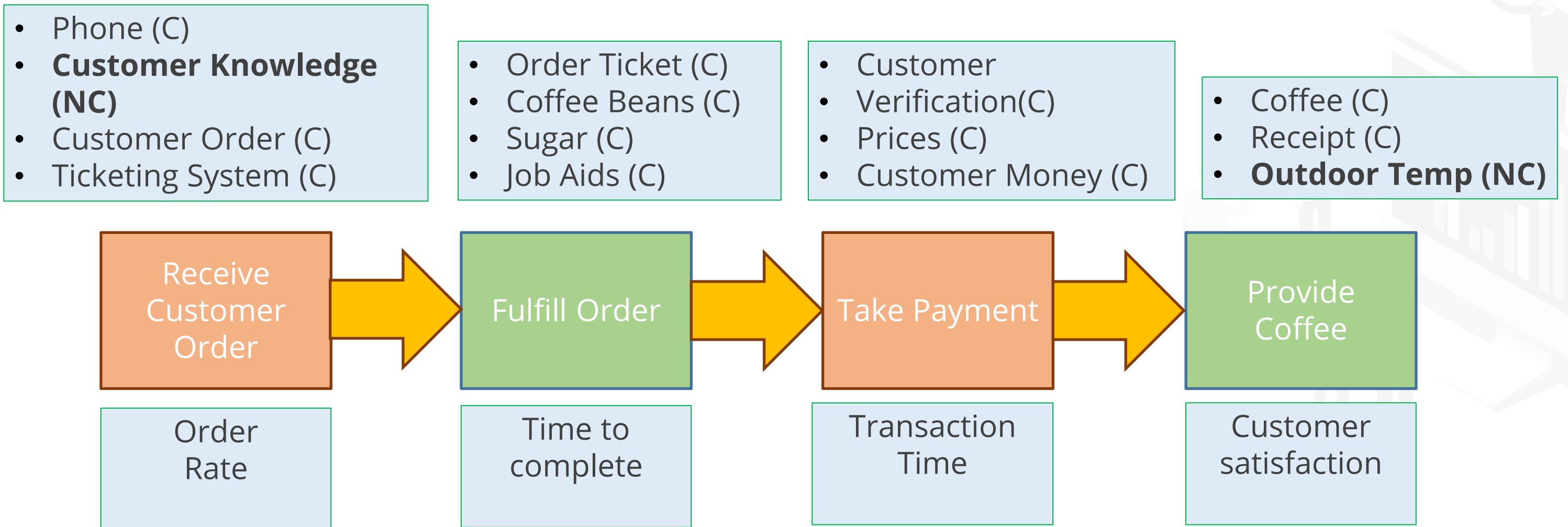
# Process Mapping: Example

## 4. List key input variables



# Process Mapping: Example

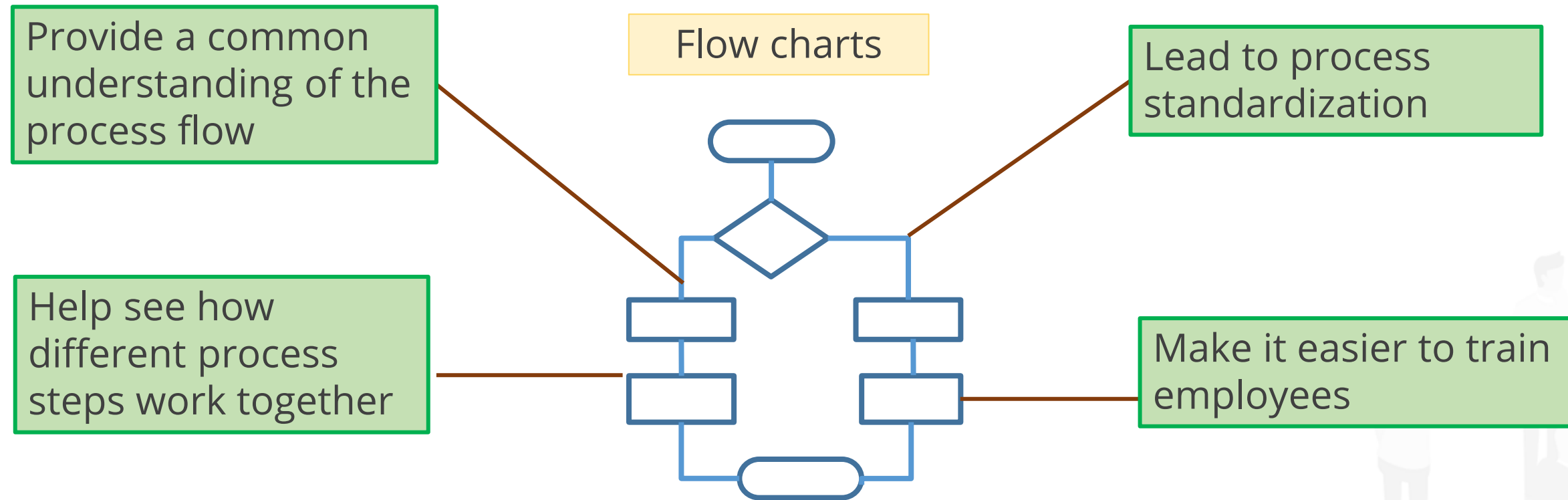
5. Classify inputs as either controllable or non-controllable





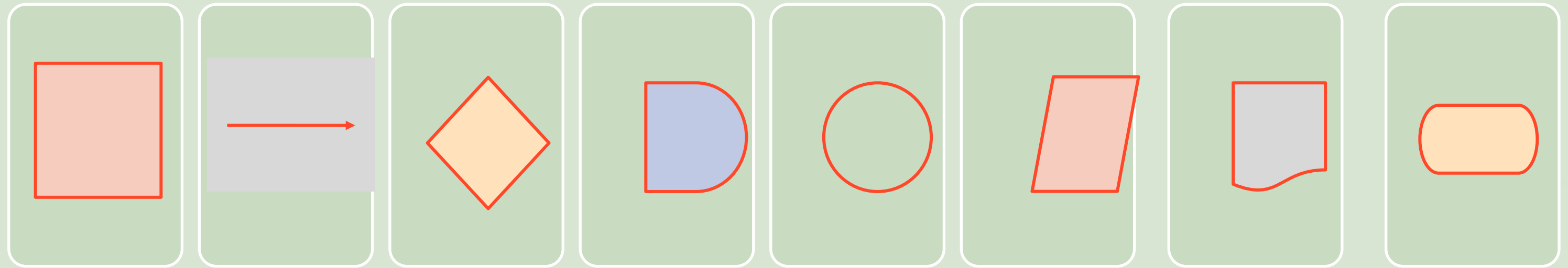
# What Is a Flowchart?

A flowchart is a pictorial representation of the steps of a process.



After the process is visualized, rework loops and redundant steps can be identified and resolved.

# Flowcharting Symbols



## PROCESS

Used to show an activity performed in the process

## ARROW

Shows the direction of flow from one step to another

## DIAMOND

Shows where a question is being asked

## BULLET

Used to indicate delay points in the process

## CIRCLE

Used when a flowchart needs to continue to another page

## PARALLEL- OGRAM

Indicates where input or output data is needed in the process

## TORN RECTANGLE

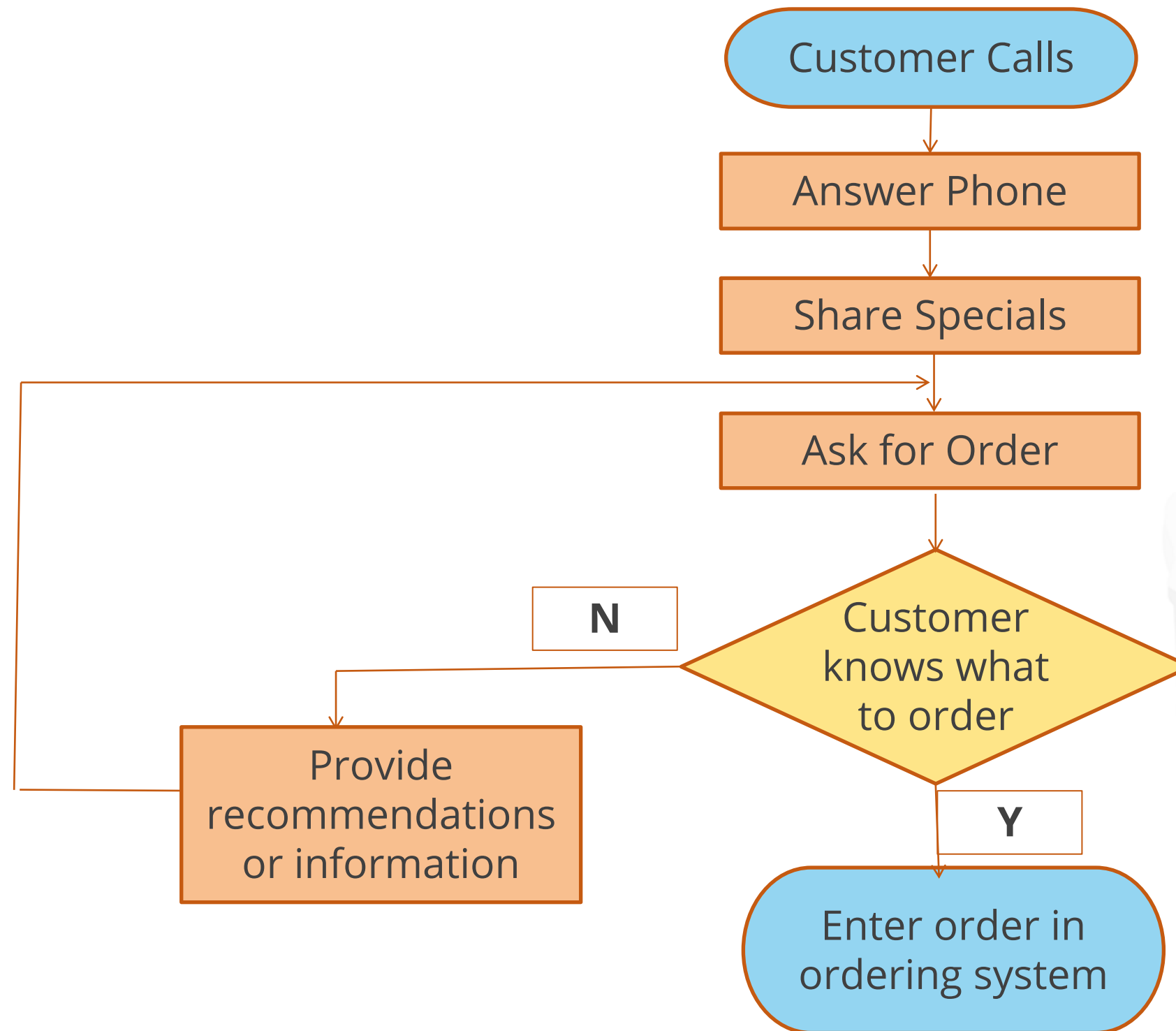
Shows where a document is needed as an input or made as an output

## OVAL

Shows the input that triggers the process and the outputs that end the process

# Flowcharting: Example

The flowchart shows the processes in Java Coffee House's "Receive Customer Order" step:





# Flowchart Analysis

Points in the process where it slows down

- Where are the long chains of tasks?
- Which activities can begin sooner than shown?

Rework loops

- Where are similar tasks being redone by other groups?

Problem areas

- Where are problems occurring due to lack of training or subpar equipment?

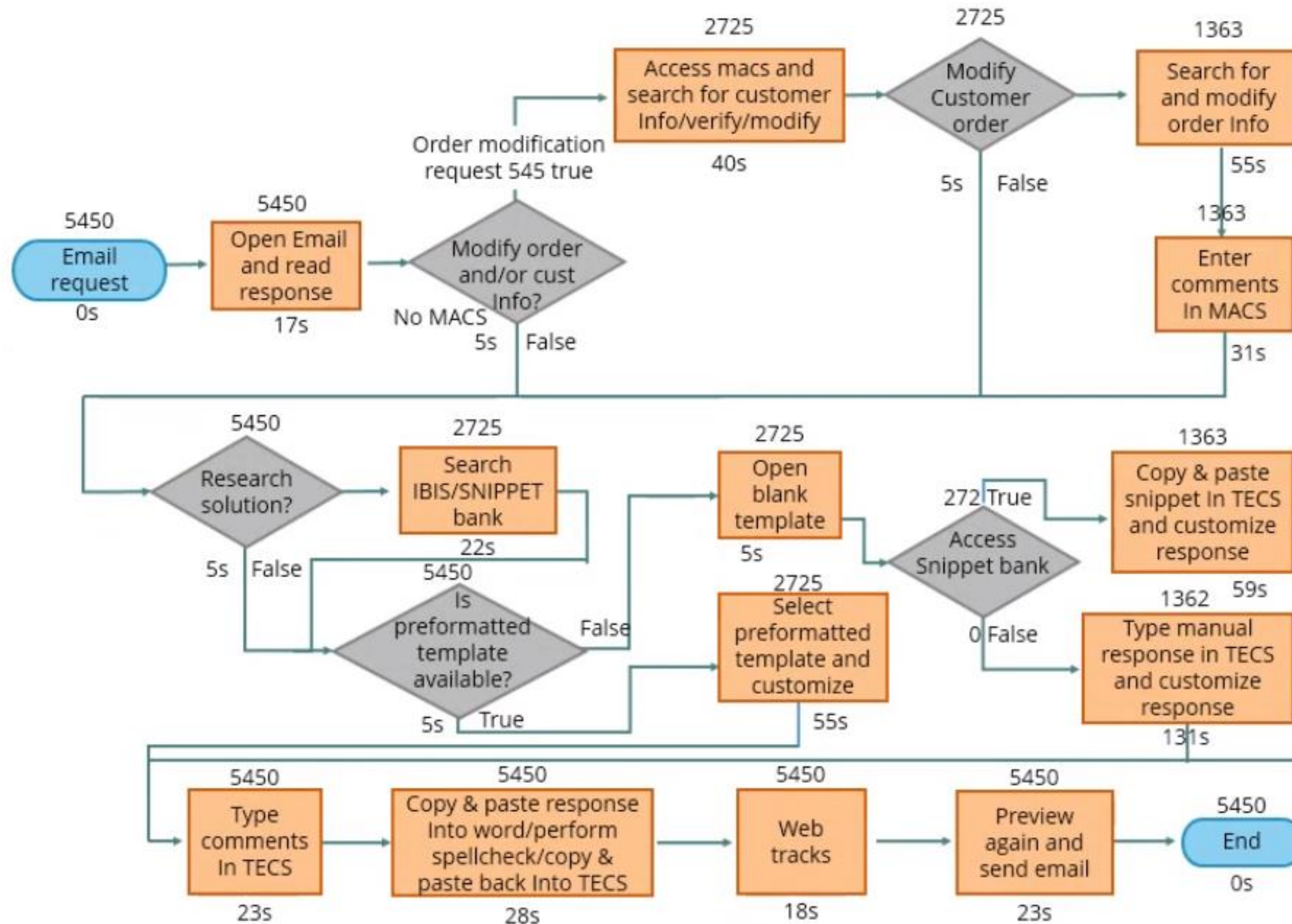
Non-value added steps

- Which steps in the process should be eliminated?
- Which steps can be combined?

Decision steps

- How often are there NOs or YESs?

# Flowchart Analysis: Example



# Written Procedures

Written procedures or SOPs are step-by-step guides that help perform a task.



Written Procedures or SOPs:

- ✧ Are simple to understand
- ✧ Used when a task is lengthy or complex
- ✧ Used in process development phases
- ✧ Help avoid making mistakes
- ✧ Help streamline processes
- ✧ Improve quality



# Written Procedures: Example

TITLE : Making Coffee

Date of original Version :

Revision Date :

APPROVED BY :

EFFECTIVE DATE :

## Making COFFEE

### 1. PURPOSE

To make 1 cup of Coffee for the Employees wanting coffee according to the Hester site standards.

### 2. RESPONSIBILITIES

Personnel who want to make coffee.

### 3. PROCEDURE

3.1 Take 500 ml S.S. Bowl, ensure the Bowl is clean and empty.

3.2 Fill the Bowl with 100 ml of potable water.

3.3 Add 2 teaspoon of Nescafe in water of Bowl.

3.4 Place the Bowl on the Stove. And lighten the Stove.

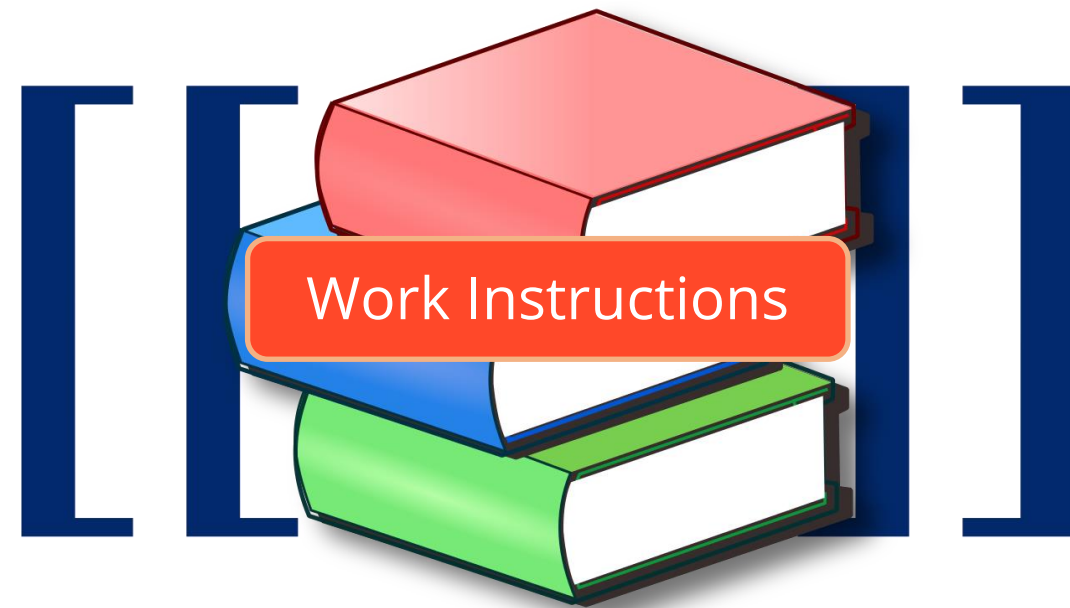
3.5 Boil for 10 minutes. (Color of the mixture will be dark brown)

3.6 Filter the mixture into the coffee cup directly.

3.7 It is ready to serve.

# Work Instructions

Work instructions have more detail than a work procedure.



Work instructions:

- ✧ Define how activities in a procedure should be written in detail
- ✧ Provide step-by-step details for a sequence of activities

## EXAMPLE

1. Take a coffee cup.
2. Pick up the coffee pitcher by the handle.
3. Slowly pour coffee into the cup until coffee is  $\frac{3}{4}$  of the way full.



For a less detailed process, select flowchart and for a detailed process, select work instructions.

# Work Instructions: Example 1

Find the filter basket. It should look something like Figure F. If you have trouble finding it, you may refer to Figure A, and look in the area indicated by the arrow after the word “Basket.” If the filter basket is not there, it is possible (though unlikely) that someone actually washed it. Perhaps it is drying in the sink. Once you have located the filter basket, you may discover that there are already coffee grounds in there. **THESE HAVE MOST LIKELY ALREADY BEEN USED. IF THEY ARE DAMP, OR THEY APPEAR THAT THEY WERE AT ONE TIME WET, THROW THEM AWAY IMMEDIATELY.**



Figure F



Next you will need to locate the paper filters (figure G). These may be stored in a stack, and you will need to select one to use in conjunction with the above-mentioned filter basket. Which one you select is entirely up to you; many people use the one on top, although others will use the second one from the top. Here is your chance to show your creativity – pick one from the middle of the stack, or take the bottom one! Once you have selected your paper filter, place it in the empty filter basket.



Figure G

A clean coffee pot is a happy coffee pot. If you’re feeling really ambitious, you can wash the coffee pot with soap and hot water. If you are comfortable with a small degree of nastiness in your coffee (which you’d better be, because nobody else washes the coffee pot with soap and water), you can just rinse out the coffee pot. If you are incredibly lazy, at least dump out any remaining coffee in the coffee pot.

Now you will need to find the coffee. This is one of the key ingredients to a successful pot of coffee. In many places of business, the coffee comes in individual pouches. (If you place of business does not have individual packages of coffee, you will need to measure an appropriate amount. Unfortunately for you, the instructions for this are beyond the scope of this document.) Each pouch contains enough coffee for exactly ONE pot of coffee. Dump the entire contents of the package into the filter that you placed in the filter basket. Place the filter basket in the appropriate location in the coffee maker (see figure A). You are almost ready to brew!

Finally, after replacing the clean/rinsed/emptied coffee pot beneath the filter basket, you are ready to start the coffee maker. You now need to locate the “START” button (see figure A). Your coffee maker may vary - it may be located in a different location, but it will most likely have the word “START” or “BREW” next to it. Many times it is red in color. After you have located the START button, you will need to press it.

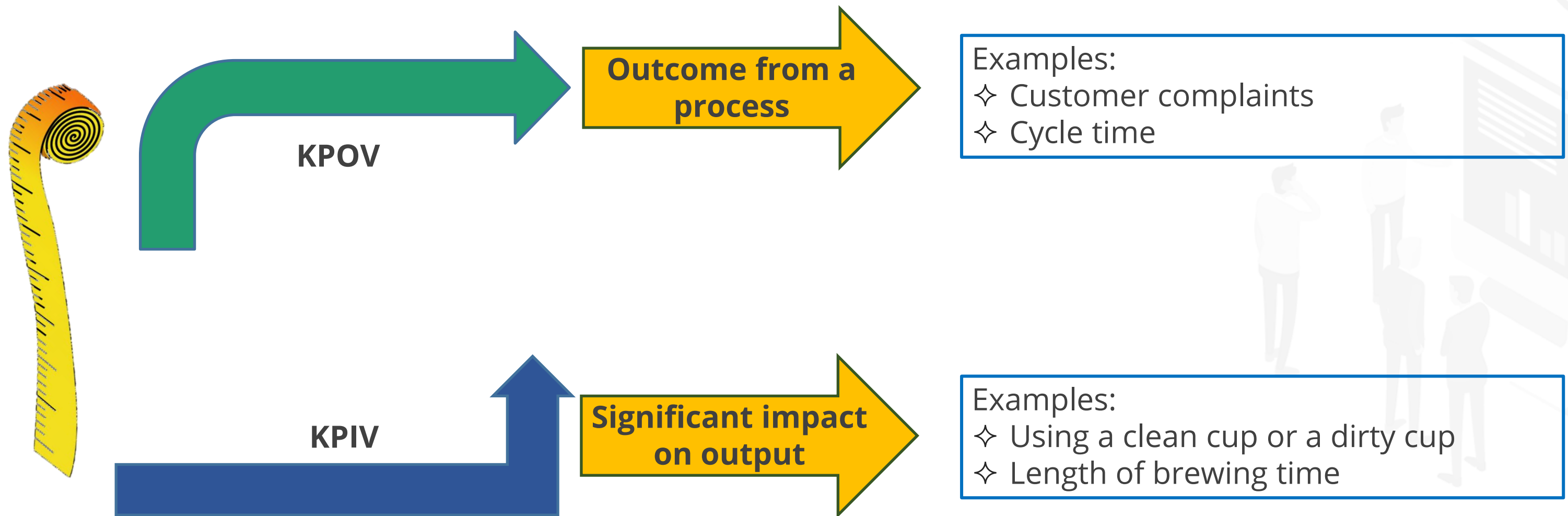


# Work Instructions: Example 2



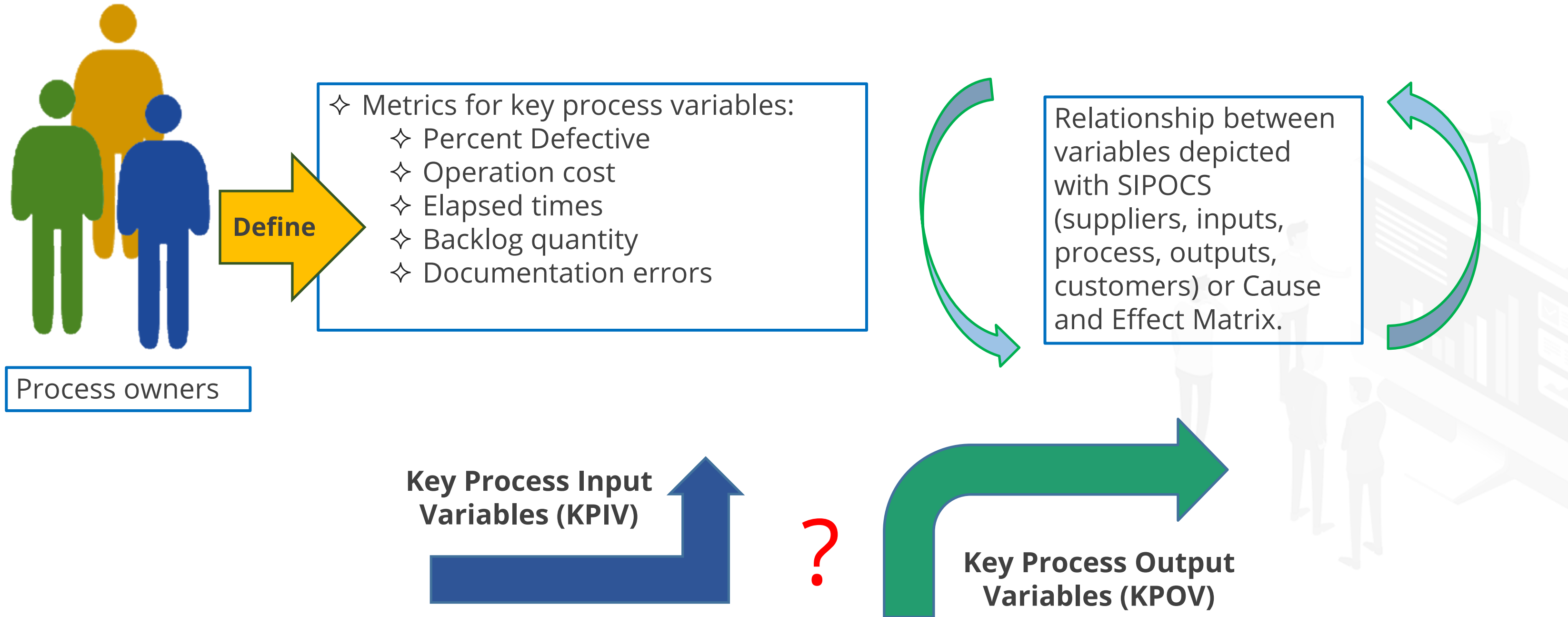
# Key Input and Output Variables

Process improvement – Needs Key Process Output Variables (KPOV)  
and  
Key Process Input Variables (KPIV) to be identified and measured



# Key Input and Output Variables

Process improvement – Needs KPOV and KPIV to be identified and measured



## Cause and Effect Matrix

## A sample Cause and Effect Matrix or X-Y Diagram

Multiply the values from (b) for each input variable, individually, with the values in (a). Adding the results gives (c).

### X-Y Diagram

## Capture the impact value

Insert the weight  
for each output

List the output variables

List the input variables

**Impact Scale: 0-none; 1-minimal;  
3-marginal; 9-highest**

Process:

Process	
Date	

Impact Scale: 0-none; 1-minimal; 3-marginal; 9-highest

Output Variables (Ys)	Description	Output Y1	Output Y2	Output Y3	Weight

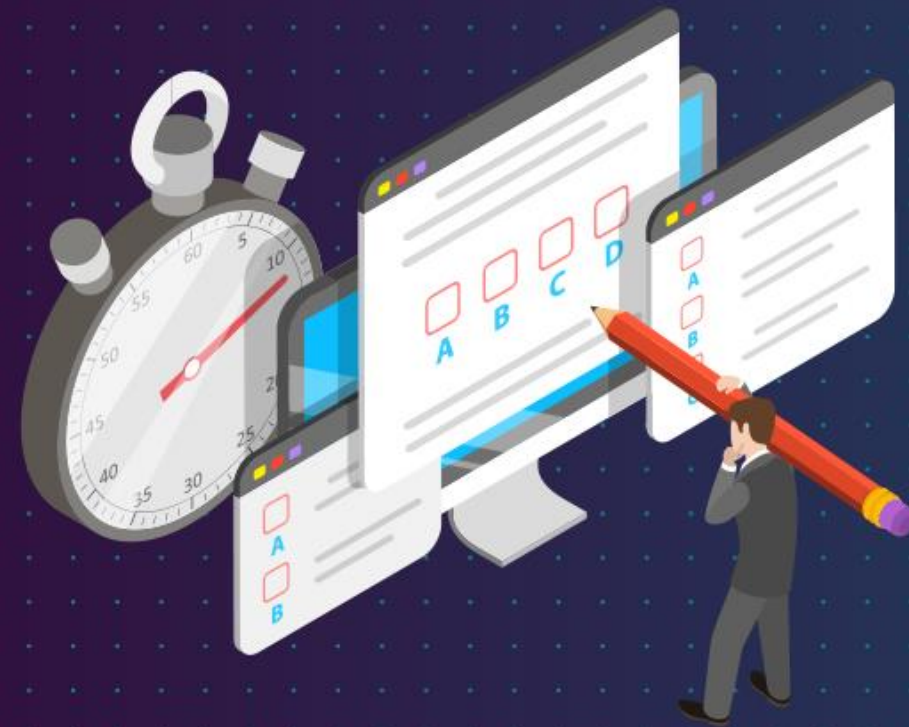
Input Variables (Xs)	Input Variable X1	Input Variable X2	Ranking
1			
2			
3			
4			
5			
6			
7			
8			
9			

## Key Takeaways

- Process mapping is a 5-step process.
- A flowchart is a pictorial representation of all the steps of a process in consecutive order.
- A flowchart is used to evaluate each activity step for opportunity conditions.
- A written procedure or standard operating procedure (SOP) is a step-by-step guide to completing a task.
- To improve a process, the Key Process Output Variables and Key Process Input Variables should be measured.
- The cause and effect diagram helps correlate process inputs and Outputs.







## Knowledge Check

## Knowledge Check

1

**Your team is making a process map for the patient registration process at a hospital facility and has just finished listing the major steps. What should your team do next?**

- A. Scope the project
- B. List key measures
- C. List key input variables
- D. Celebrate

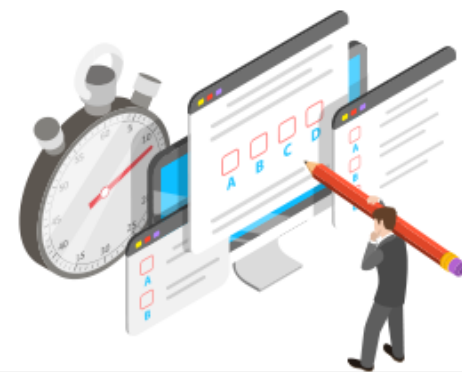


## Knowledge Check

1

Your team is making a process map for the patient registration process at a hospital facility and has just finished listing the major steps. What should your team do next?

- A. Scope the project
- B. List key measures
- C. List key input variables
- D. Celebrate



The correct answer is **B**

In process map creation, after the major steps are identified, the next step is to list the key measures for success at each step.

## Knowledge Check

2

Which of the following is NOT a process documentation tool?

- A. Flow Charts
- B. Process Maps
- C. Cause and Effect Matrix
- D. Written Work Instructions

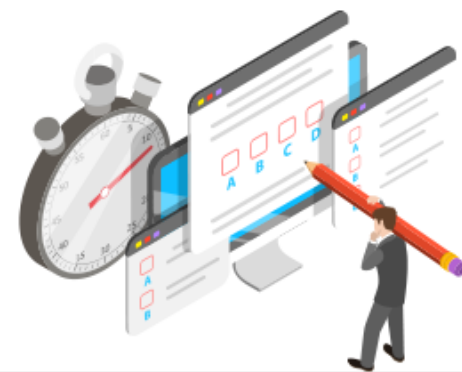


## Knowledge Check

2

Which of the following is NOT a process documentation tool?

- A. Flow Charts
- B. Process Maps
- C. Cause and Effect Matrix
- D. Written Work Instructions



The correct answer is **C**

**The Cause and Effect Matrix is a prioritization tool and is not used to document a process.**



## Knowledge Check

3

**What is the purpose of process mapping?**

- A. To visualize the steps in the process
- B. To understand the key measures and metrics
- C. To identify improvement opportunities
- D. All of the options



## Knowledge Check

3

What is the purpose of process mapping?

- A. To visualize the steps in the process
- B. To understand the key measures and metrics
- C. To identify improvement opportunities
- D. All of the options



The correct answer is **D**

The purpose of process mapping includes all the answer choices given.