

Software Measurement (SOEN6611)

Summer 2023

Descriptive Statistics

Team "Amsterdam Cartel"

Deliverable 1

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# List of Symbols and Abbreviations

GQM Goal Question Metric  
UC Use Case

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# 1 Introduction

## 1.1 Problem 1

Using the Goal-Question-Metric (GQM) approach (or one of its extensions), present one goal specific to METRICSTICS and articulate  $2N$  questions related to that goal, where  $N$  is the team size. Discuss whether any metrics help answer those questions. NOTES: The goals must aim to be SMART.

There are four phases in the GQM measurement process: (1) Planning Phase, (2) Definition Phase, (3) Data Collection Phase, and (4) Interpretation Phase

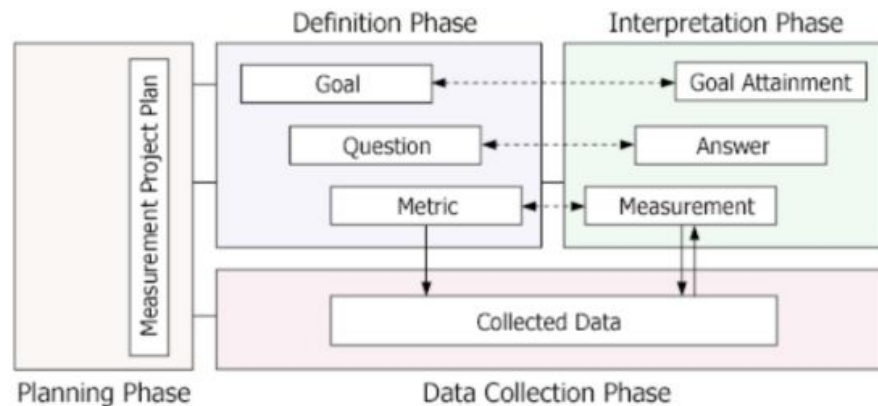


Figure 1.1: Data Planning and Collection Phase

### 1.1.1 Smart

The goal is considered to be smart if it has the following qualities:

**Specific:** Is the goal specific? (For example, is the goal too general to be understandable?)

**Measurable:** Is the goal associated with quantitative criteria for verifying attainment?

**Attainable:** Is there a consensus that this goal is achievable? (For example, is the goal too impractical to be feasible?) Is there resource allocation towards the goal?

**Realistic:** Is the goal rationalized? (For example, is it clear why an entity is being measured?) Is the goal within the scope of what the person responsible for software measurement program is expected to accomplish?

**Timely:** Is the goal time-limited (that is, is there a specific start- and end-date for the goal)? (For example, is there time allocated in the project schedule toward collecting data and tracking progress toward the goal?)

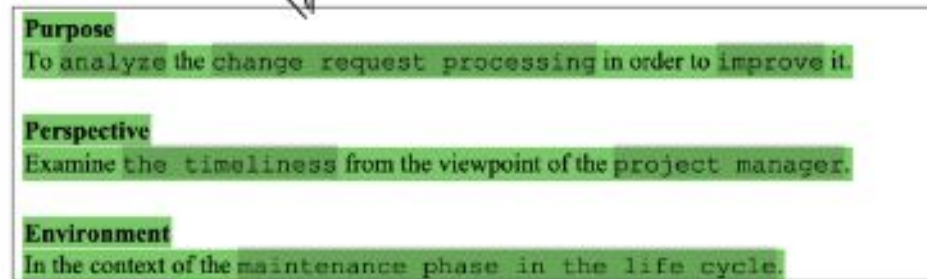
## 1.2 Problem 2

Using the given description, construct a use case model for METRICSTICS. This description must include definitions of actors and use cases. **NOTES** There can be several use cases, including saving data in memory, restarting a session, and so on. A statistical calculator<sup>1</sup> could be used as a motivation to ‘elicit’ necessary use cases.

From the given description, the **salient information** can be **highlighted** to facilitate extraction:

**A project manager has the task of improving the timeliness of change request processing during the maintenance phase of the life cycle of a project P.**

Then, based on the above and according the template given earlier, the following is the goal:



<b>Purpose</b>
To analyze the change request processing in order to improve it.
<b>Perspective</b>
Examine the timeliness from the viewpoint of the project manager.
<b>Environment</b>
In the context of the maintenance phase in the life cycle.

The following are some possible questions associated with the goal, and the possible metrics associated with each question:

- **Q1: What is the current change request processing speed?**
  - **M1: Average Cycle Time.**
  - **M2: Standard Deviation.**
- **Q2: Is the current performance satisfactory from the viewpoint of the project manager?**
  - **M3: Heuristic Evaluation by the Project Manager.**

It could be noted that the metrics **M1 and M2 are objective**, while **M3 is subjective**.

## 1.3 dataset

[https://www.kaggle.com/code/knightbearr/analysis-sales-data-knightbearr/input?select=Sales  
December 2019.csv](https://www.kaggle.com/code/knightbearr/analysis-sales-data-knightbearr/input?select=Sales%20December%202019.csv)

## 2 Problem 1

### 2.1 Goal

To develop the Sales Analytics System, named METRICSTICS, a critical system will be implemented in order to comprehensively analyze sales performance. This subsystem will seamlessly integrate with the in-store sales system, facilitating the collection of detailed customer data.

This system will examine statistical analysis of sales data to empower the sales management team in effectively monitoring sales trends over time, conducting thorough analyses of sales history, and making informed decisions based on the insights gained. Both sales staff and sales administration personnel will have access to METRICSTICS, allowing the sales team to diligently input sales data and the sales manager to effortlessly access statistical information for specific time periods. Additionally, METRICSTICS will enable the generation of comprehensive reports on a monthly, quarterly, and yearly basis, which will be presented to the board of members.

\*Note: The key stakeholders for METRICSTICS are sales representatives, sales managers

### 2.2 Analyze Metricstics

Analyze the sale's history to understand the sale trend during the years to project METRICSTICS from the viewpoint of the sales manager

1. What is the percentage increase or decrease in sales over each month? Metric: Calucate
2. What is the average of sales monthly and quarterly? (Mean) Metric: Average(Mean) monthly sales Average(Mean) quarterly sales Mechanism: i. Owner = Sales Managers ii. Frequency Collected = following the monthly report generation iii. Frequency Reported = Monthly and Quarterly
3. What is the biggest sales growth and decline rate this year by monthly and quarterly? (MAX and MIN) metric: Maximum monthly sales decline rate Minimum monthly sales decline rate Maximum quarterly sales decline rate Minimum quarterly sales decline rate Mechanism: i. Owner = Sales Managers ii. Frequency Collected = following the monthly



report generation iii. Frequency Reported = Monthly and Quarterly

4. How to determine that each month's and quarter's sales experience growth or decline? Metric: compute the baseline(MAD) in terms of monthly and quarterly sale, and compare it in monthly sale and quarterly sale. Mechanism: i. Owner = Sales Managers ii. Frequency Collected = following the monthly report generation iii. Frequency Reported = Monthly and Quarterly

5. Which month and quarter experienced the most significant sales change over the year? (standard deviation)(mean) Metric: standard deviation of monthly and quarterly sales Mechanism: i. Owner = Sales Managers ii. Frequency Collected = following the monthly report generation iii. Frequency Reported = Monthly and Quarterly

6. Question(Mode): How to calculate the top 10 items that customers purchased at least twice on this platform monthly and quarterly, sorted by the number of purchases Metric: Count the number of times each item is purchased in a month, find the items purchased more than once and sort them by their purchasing times, both in monthly and quarterly. Mechanism: i. Owner = Sales Managers ii. Frequency Collected = following the monthly and quarterly report generation iii. Frequency Reported = monthly and quarterly

7. Question (Mode): What is the most popular item monthly? Metric: Count the number of times each item is purchased in a month and find the item with the highest count. Mechanism: i. Owner = Sales Managers ii. Frequency Collected = following the monthly report generation iii. Frequency Reported = Monthly

8. Question(Mode): In which city residents make the biggest purchases on this platform for the whole year? Metric: Count the number of purchases based on the city extracted from purchase addresses and find the city with the highest count. Mechanism: i. Owner: Sales Managers ii. Frequency Collected = following the yearly report generation iii. Frequency Reported = Yearly

9. Question (Max): How to determine the day of the year when people engage in the highest amount of shopping? Metric: Count the number of purchases each day in a year and find the day with the highest count. Mechanism: i. Owner = Sales Managers ii. Frequency Collected = following the yearly report generation iii. Frequency Reported = Yearly

## 3 Problem 2

### 3.1 Use Case Model

Login in to the system

Primary Actor: Sale Representative, Sale Manager

Prioity: High

Description:Users are able to login to the system

Pre-condition: User have valid account on the system

Normal Flow:

User open the login page of the system

System display the login page

User enter username and password

User Clicks on “login” button

System check the User’s credentials

System display the home page

User see the home page.

Sale staffs are able to do the data entry

Primary Actor: Sale Representative

Prioity: High

Description:Sale Representatives are able to entry the data regarding the customer purchasing item

Pre-condition: Sale Representative login to the system

Normal Flow:

User able to see the data entry page

System display the data entry page

Users are able to enter the name of the item, purchase date, customer’s address, quantity of item, and etc.

User click the submit button

System store the sale data to database

System redirect to data entry page again with empty input.

Sales managers are able to view the statistics result generated from the sales history data

Primary Actor: Sales Manager

Prioity: High

Description:Sales Manager is able to view the statistics result generated from the sales history data

Pre-condition: Sales Manager is able to login to the system.

Corresponding sales data are ready in the system.

Normal Flow:

User is able to see the report page

User is able to enter the conditions for the report, like time duration or specific month, etc.

User clicks the submit button to calculate the statistics

User is able to view the statistics results.

Generate report in monthly and quarterly

Primary Actor: System itself or Sales Manager

Priority: High

Description: Sales Manager is able to generate the statistics report in both monthly and quarterly

Pre-condition: Sales Manager is able to login to the system. Sales data is ready in the system.

Normal Flow:

User is able to see the report page

User is able to enter the conditions for the report, like time duration or specific month, etc.

Or sales manager sets the needed report and the system itself will generate on time.

Other Possible Use Cases ??

Sale manager are able to see the average sale in monthly

Display month-over-month ratio

Display current status of sale pass the baseline or not

Display 10 popular item based on past sale history

Display popular item in monthly

## 3.2 Github Repository

[https://github.com/hemareddy123/SOEN\\_6611\\_Summer2023/tree/main](https://github.com/hemareddy123/SOEN_6611_Summer2023/tree/main)

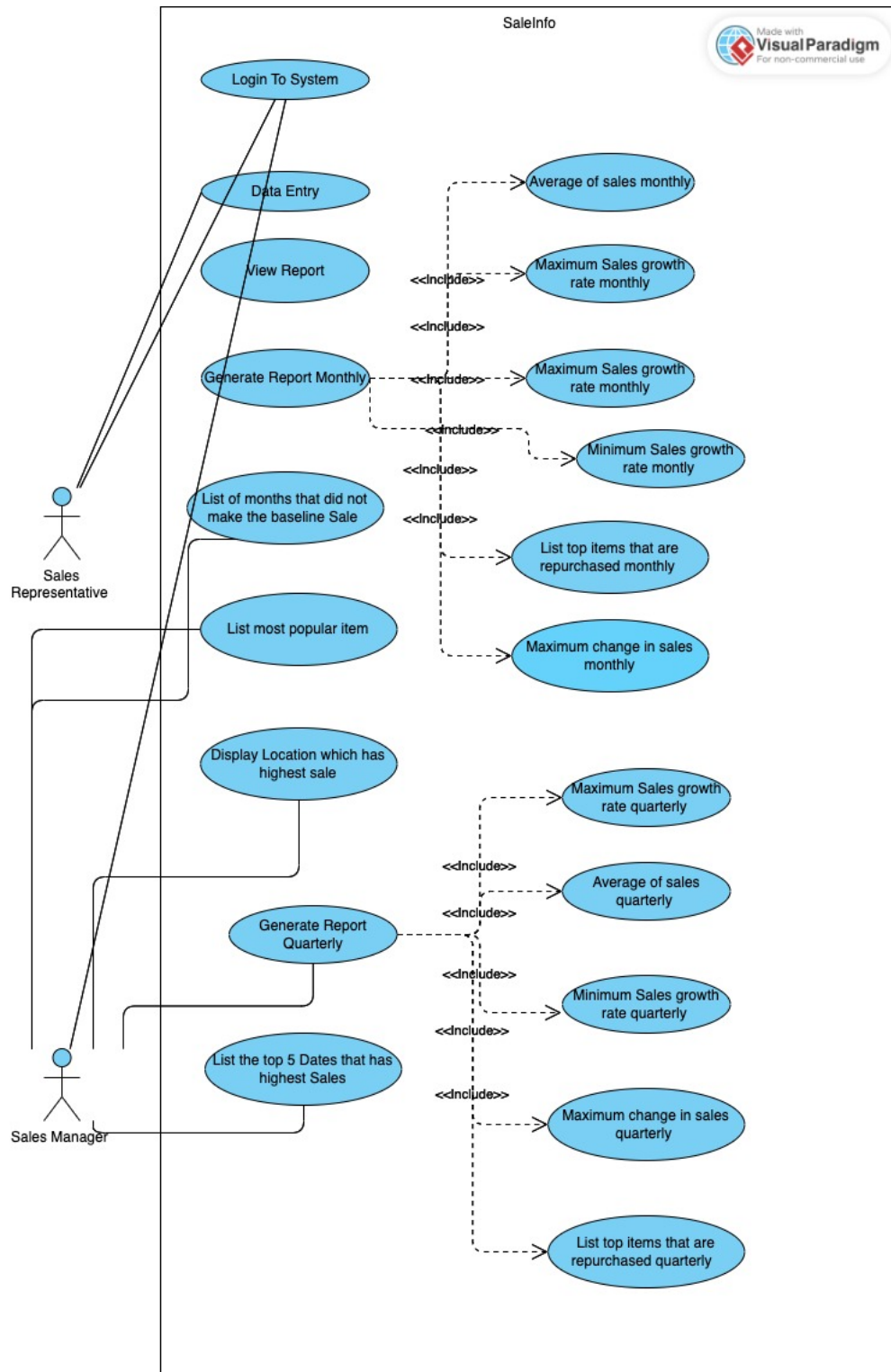


Figure 3.1: Use Case Model

<b>Use Case ID</b>	1
<b>Use Case Name</b>	Login Into System
<b>Primary Actors</b>	Sale Representative, Sale Manager
<b>Priority</b>	High
<b>Description</b>	Users are able to login to the system
<b>Pre-Condition</b>	User have valid account on the system
<b>Post-Condition</b>	User Logged In Successfully
<b>Normal Flow</b>	<ul style="list-style-type: none"> <li>• User open the login page of the system</li> <li>• System display the login page</li> <li>• User enter username and password</li> <li>• User Clicks on "login" button</li> <li>• System check the User's credentials</li> <li>• System display the home page</li> <li>• User see the home page</li> </ul>

Figure 3.2: Use Case 1

<b>Use Case ID</b>	2
<b>Use Case Name</b>	Data Entry
<b>Primary Actors</b>	Sale Representative
<b>Priority</b>	High
<b>Description</b>	Sale Representatives are able to entry the data regarding the customer purchasing item
<b>Pre-Condition</b>	Sale Representative login to the system
<b>Post-Condition</b>	User successfully added data
<b>Normal Flow</b>	<ul style="list-style-type: none"> <li>• User able to see the data entry page</li> <li>• System display the data entry page</li> <li>• Users are able to enter the name of the item, purchase date, customer's address, quantity of item, and etc.</li> <li>• User click the submit button</li> <li>• System store the sale data to database</li> <li>• System redirect to data entry page again with empty input.</li> </ul>

Figure 3.3: Use Case 2

<b>Use Case ID</b>	3
<b>Use Case Name</b>	View The Statistics Result
<b>Primary Actors</b>	Sale Manager
<b>Priority</b>	High
<b>Description</b>	Sales Manager is able to view the statistics result generated from the sales history data
<b>Pre-Condition</b>	Sales Manager is able to login to the system. Corresponding sales data are ready in the system
<b>Post-Condition</b>	User is able to see the report page
<b>Normal Flow</b>	<ul style="list-style-type: none"> <li>• User is able to see the report page</li> <li>• Users are able to enter the conditions for the report, like time duration or specific month, etc.</li> <li>• User clicks the submit button to calculate the statistics</li> <li>• User is able to view the statistics results</li> </ul>

Figure 3.4: Use Case 3

<b>Use Case ID</b>	4
<b>Use Case Name</b>	Generate report in monthly
<b>Primary Actors</b>	System itself or Sales Manager
<b>Priority</b>	High
<b>Description</b>	Sales Manager is able to generate the statistics report in both monthly and quarterly.
<b>Pre-Condition</b>	Sales Manager is able to login to the system. Sales data is ready in the system.
<b>Post-Condition</b>	User is able to generate the report
<b>Normal Flow</b>	<ul style="list-style-type: none"> <li>• User is able to see the report page</li> <li>• Users are able to enter the conditions for the report, like time duration or specific month, etc.</li> <li>• Or the sales manager sets the needed report and the system itself will generate on time.</li> <li>•</li> </ul>

Figure 3.5: Use Case 4

<b>Use Case ID</b>	5
<b>Use Case Name</b>	Generate report in quarterly
<b>Primary Actors</b>	System itself or Sales Manager
<b>Priority</b>	High
<b>Description</b>	Sales Manager is able to generate the statistics report in both monthly and quarterly.
<b>Pre-Condition</b>	Sales Manager is able to login to the system. Sales data is ready in the system.
<b>Post-Condition</b>	User is able to generate the report
<b>Normal Flow</b>	<ul style="list-style-type: none"> <li>• User is able to see the report page</li> <li>• Users are able to enter the conditions for the report, like time duration or specific month, etc.</li> <li>• Or the sales manager sets the needed report and the system itself will generate on time.</li> <li>•</li> </ul>

Figure 3.6: Use Case 5

<b>Use Case ID</b>	6
<b>Use Case Name</b>	List of months that did not make the baseline Sale requirement
<b>Primary Actors</b>	Sale Manager
<b>Priority</b>	Low
<b>Description</b>	Users is able to see list of months whose sales requirement were not met
<b>Pre-Condition</b>	Users have a valid account on the system.Sales data is ready in the system.
<b>Post-Condition</b>	User is able to generate the list successfully
<b>Normal Flow</b>	<ul style="list-style-type: none"> <li>• Users are able to see the report page</li> <li>• Users are able to see the sales of a selected month from the list.</li> </ul>

Figure 3.7: Use Case 6

<b>Use Case ID</b>	7
<b>Use Case Name</b>	List most popular Item
<b>Primary Actors</b>	Sale Manager
<b>Priority</b>	Low
<b>Description</b>	Users is able to see the most popular item
<b>Pre-Condition</b>	Users have a valid account on the system.Sales data is ready in the system.
<b>Post-Condition</b>	User is able to generate the most popular item
<b>Normal Flow</b>	<ul style="list-style-type: none"> <li>• Users are able to see the report page</li> <li>• Users are able to see the sales of a selected item.</li> </ul>

Figure 3.8: Use Case 7

<b>Use Case ID</b>	8
<b>Use Case Name</b>	List most popular Item
<b>Primary Actors</b>	Sale Manager
<b>Priority</b>	Low
<b>Description</b>	Users is able to see the most popular item
<b>Pre-Condition</b>	Users have a valid account on the system.Sales data is ready in the system.
<b>Post-Condition</b>	User is able to generate the most popular item
<b>Normal Flow</b>	<ul style="list-style-type: none"> <li>• Users are able to see the report page</li> <li>• Users are able to see the sales of a selected item.</li> </ul>

Figure 3.9: Use Case 8



<b>Use Case ID</b>	9
<b>Use Case Name</b>	Display Location which has highest sale
<b>Primary Actors</b>	Sale Manager
<b>Priority</b>	Low
<b>Description</b>	Users is able to see the Location which has highest sale
<b>Pre-Condition</b>	Users have a valid account on the system.Sales data is ready in the system.
<b>Post-Condition</b>	User is able to generate the most popular item
<b>Normal Flow</b>	<ul style="list-style-type: none"> <li>• Users are able to see the report page</li> <li>• Users are able to see the sales of a selected Location.</li> </ul>

Figure 3.10: Use Case 9

<b>Use Case ID</b>	10
<b>Use Case Name</b>	List the top 5 Dates that has highest Sales
<b>Primary Actors</b>	Sale Manager
<b>Priority</b>	Low
<b>Description</b>	Users is able to see the top 5 Dates that has highest Sales
<b>Pre-Condition</b>	Users have a valid account on the system.Sales data is ready in the system.
<b>Post-Condition</b>	User is able to generate the most popular item
<b>Normal Flow</b>	<ul style="list-style-type: none"> <li>• Users are able to see the report page</li> <li>• Users are able to see the sales of the top 5 dates displayed .</li> </ul>

Figure 3.11: Use Case 10

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