PROJECT REPORT

RETAILOR STORE STOCK INVENTORY ANALYTICS

submitted by
PNT2022TMID48449

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Project Report

Team ID	PNT2022TMID48449
Project Name	RETAIL STORE STOCK INVENTORY ANALYTICS

1. INTRODUCTION

1.1Project Overview:

In recent years inventory management plays the major role in retail store business. Based on the good management of the inventory the retailer can easily maintain all the records of products, improve the availability of the product and importantly can easily optimize the usage of inventory which will improve the profit of the retail store. The bad management of inventory leads to miscalculation in the inventory which leads to under use or over use of inventory which ultimately affect the profit of the retailer which leads to loss. So in this proposed solution with the help of IBM Cognos the retailer can easily understand the flow and effectively use the resources.

1.2 Purpose:

In now a days retail stores are been volatile it is mainly due to improper management of stocks in inventory. Improper inventory management leads to less availability in high demands situation and high availability in lower demand situation. With the help of better management in inventory the retailer can easily reduce the unwanted situations in the store.

Even though with the availability of all the needed information it needs more knowledge to analyse and forecast the future need. So now most of the industries are uses the advanced methods to calculate the profits and future demand and goals.

In this method all the data are represented in graphical view so retailers can easily analyse the sales and profit of his store. The retailer can easily calculate demand and the future need. It also forecast the future with the help of Cognos.

2.LITERATURE SURVEY:

Paper 1: "Coping with demand volatility in retail shop with the aid of big data exploration"

In addition to big data, some algorithms analyze social media and web browsing trends to predict the next big thing in the retail market. Perhaps one of the most interesting data points for forecasting demand is the weather. Brands like Walgreens and Pantene worked with the Weather Channel to account for weather patterns in order to customize product recommendations for consumers. Walgreens and Pantene anticipated increases in humidity--a time when women would be seeking anti-frizz products--and served up ads and in-store promotions to drive sales. The purchase of Pantene products at Walgreens increased by 10 percent over two months and Walgreens saw a 4 percent sales lift across the hair care category during that same period. Retail forecasting and retail projections are used to properly allocate their resources the most effectively throughout different parts of the year.

Paper 2: Evaluation of the Wateen App in the Blood-Donation Process in Saudi Arabia (Tour Kiah Alessa, April 2022)

Retail inventory management is the process of ensuring you carry merchandise that shoppers want, with neither too little nor too much on hand. By managing inventory, retailers meet customer demand without running out of stock or carrying excess supply.

In practice, effective retail inventory management results in lower costs and a better understanding of sales patterns

Inventory management is vital for retailers because the practice helps them increase profits. They are more likely to have enough inventory to capture every possible sale while avoiding overstock and minimizing expenses.

Paper 3: Product demand in market

Market demand describes the demand for a given product and who wants to purchase it. This is determined by how willing consumers are to spend a certain price on a particular good or service. down as well. Market demand is the total of what everyone within a specific industry desire and can help guide merchants when building an ecommerce site.

Paper 4: Billing in retail stores

A billing software for retail shop serves as its heartbeat. It enables you to keep track of all business exertions from any location. It ensures that your company runs smoothly and efficiently, lowering

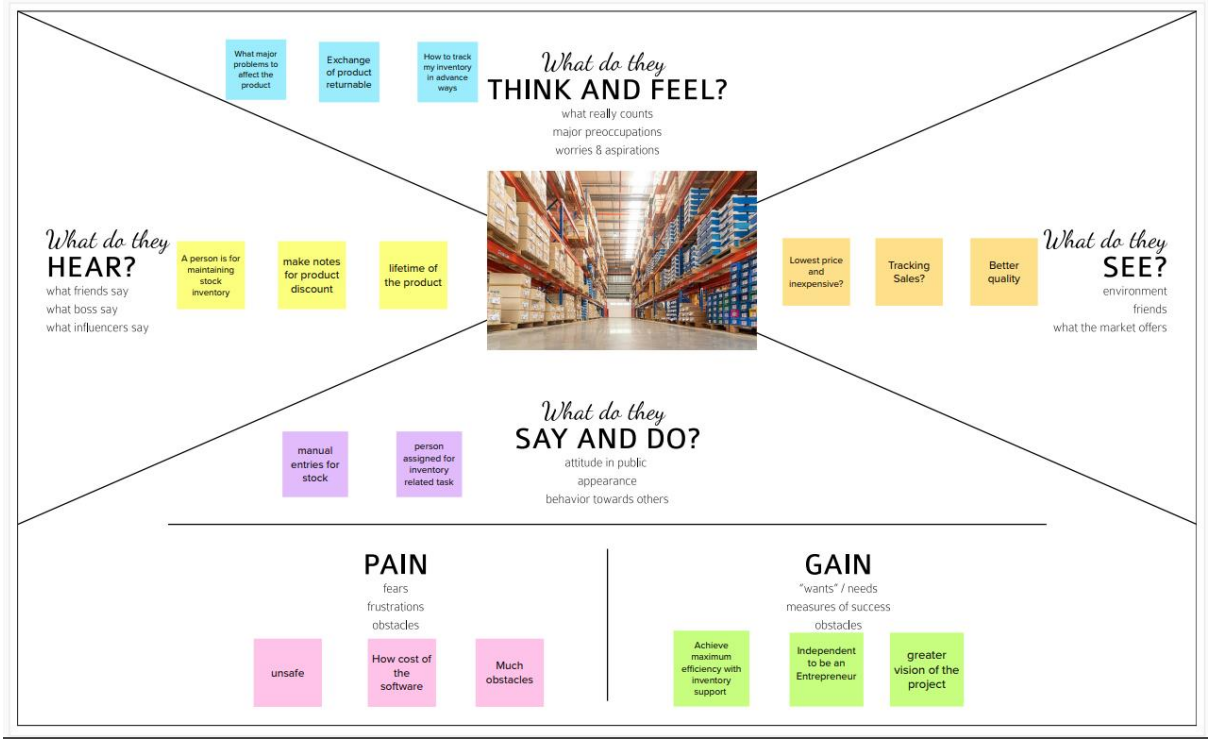
operational costs. Furthermore, it enables you to understand your customers' behaviour in a specific area so that you can maintain your stock in accordance with demand. So, if you don't want to miss out on the various benefits that billing software provides, it's critical for your retail business to have billing software from the start.

2.2Problem Statement Definition:

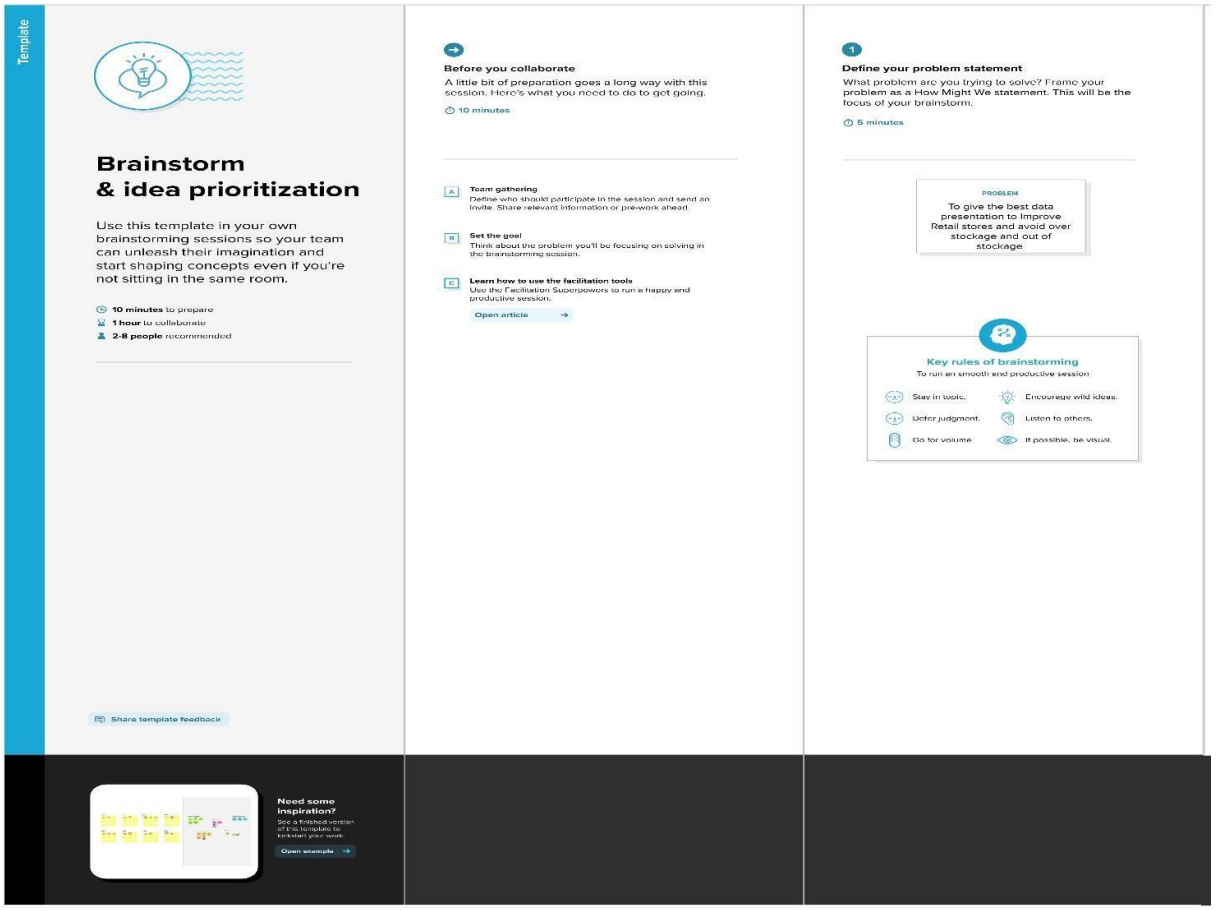
Problem Statement (PS)	**I am (Customer)**	**I'm trying to**	**But**	**Because**	**Which makes me feel**
PS-1	A Local Broker	To supply goods to local area shops	I am unable to satisfy the extensive needs	Due to the sudden change in demands of goods from the customers and insufficient storage capacity	hopeless
PS-2	A beginner trader	Sell/buy stocks on my phone	It leads to losses	Of insufficient knowledge on how stocks move over years based on previous data's	depressed

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas



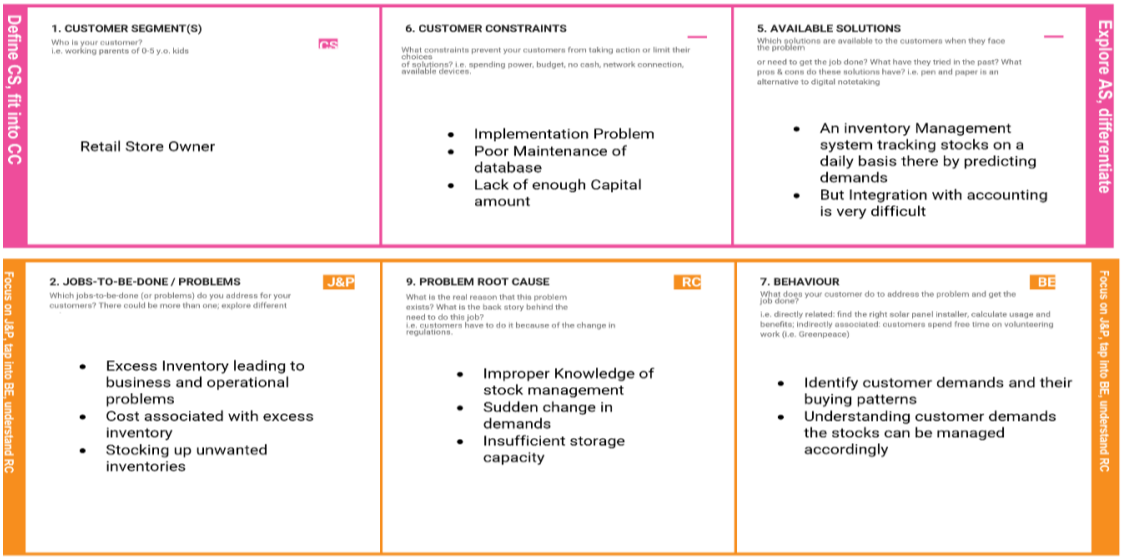
3.2 Ideation & Brainstorming

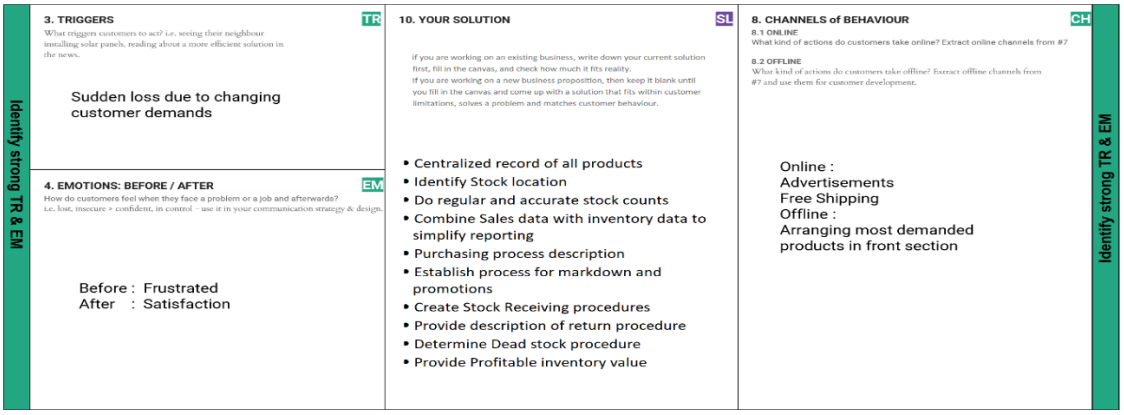


3.3 Proposed Solution

S. No	Parameter	Description
1.	Problem Statement (Problem to be solved)	Retail inventory management is the process of ensuring that shoppers want, with neither too little nor too much on hand. By managing inventory, retailers meet customer demand without running out of stock of carrying excess supply or carrying excess supply. Inventory management is vital for retailers because the practice helps them increase profits
2.	Idea / Solution description	The described solution is by using IBM Cognos we can display all the records and previous years sales comparison as a graphical representation.
3.	Novelty / Uniqueness	In general, all the records are made in complex tables it is very difficult to understand by the retailers. So, we are going to display and the comparison and analyse in graphical view using IBM Cognos which that the use can easily understand the requirements and needs. those sales information to track the sales and easy improve the efficiency in analyse.
4.	Social Impact / Customer Satisfaction	The user product details are stored in cloud so the user can access and bill the products using any devices which the user can affordable
5.	Business Model (Revenue Model)	Since it analyses the inventory needs from the sale, we are going to provide some premium content in subscription for example if the user wants to store more than 100 products details or for provide bill for more than 250 customer they need to subscribe. They can use the service free if the above constrains are minimal
6.	Scalability of the Solution	Our main focus is small and medium level retail stores. So, everybody can account their sales and profit margin and it provide the solution for which the small retailers doesn't provide bills for the customers. The advantage in the system may attract more and more retailers to use the web app.

3.4 Problem Solution fit





4. REQUIREMENT ANALYSIS

4.1 Functional requirement

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through From Registration through Gmail
FR-2	User Confirmation	• Confirmation via Email • Confirmation via OTP
FR-3	User Login	Login with username Login with password
FR-4	Profile update	Update the user credentials Update the Contact details
FR-5	Uploading Data	• Collect the customer details as well as product details • Upload the product details • This model predicts the best sold products and also it analysis the available stocks
FR-6	Recommendation	User will request for Item Get the Item recommendations
FR-7	Ratings and Reviews	The user i.e. retailer of any shop can give their ratings and view of this models

4.2 Non-Functional requirements

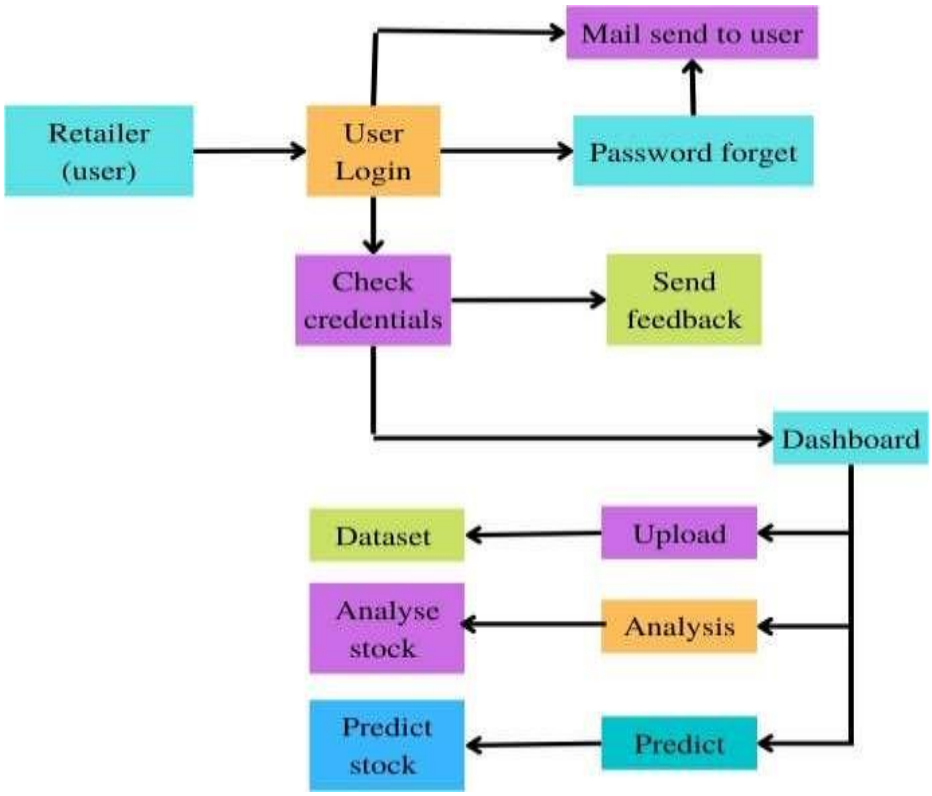
Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	They are more likely to have enough inventory to capture every possible sale while avoiding overstock and minimizing expenses. .
NFR-2	**Security**	This can be used only by the users who have their proper login credentials
NFR-3	**Reliability**	• Avoid over or understocking • Ensure accurate inventory valuation • Prevent order delays • Reduce dead stock
NFR-4	**Performance**	From this, the model can predict the dead stocks and highly profitable stocks. The accuracy of this model will be ensured by checking multiple times
NFR-5	**Availability**	This model is suitable for all kinds of retail stores. It can give retailers real-time visibility into stock levels,avoid stockouts, keep inventory carrying costs low and help meet customer expectations
NFR-6	**Scalability**	More users can be accessed at the same time without any issues. The feedback of the users will be taken and be proceeded further up to the satisfaction of the user. .

5.PROJECT DESIGN

5.1Data Flow Diagrams

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.



5.2 Solution & Technical Architecture:

5.3 User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the web application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, after completing the registration I will receive confirmation email once I have registered for the web application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the web application through LinkedIn	I can register & access the dashboard with LinkedIn Login	Low	Sprint-2
		USN-4	As a user, I can register for the web application through Google account	I can register & access the dashboard with Gmail login	Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password after installing the web application	I can access the dashboard by login into the application	High	Sprint-1
	Dashboard	USN-6	As a user, I can view the charts and graphs representation of the dataset and the information shown in the dashboard	I can analyse the stocks in my retail store.	High	Sprint-1
Customer (Web user)		USN-1	As a user, I can register for the web application entering my email, password, confirming my password.	I can access my account / dashboard	High	Sprint-1
Customer Care Executive		USN-2	As a user, after completing the registration I will receive confirmation email once I have registered for the web application	I can receive confirmation email & click confirm	High	Sprint-1

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Administrator		USN-3	As a user, I can register for the web application through LinkedIn	I can register & access the dashboard with LinkedIn Login	Low	Sprint-2
		USN-4	As a user, I can register for the web application through Google account	I can register & access the dashboard with Gmail login	Medium	Sprint-1
	Login	USN-5	As a user, I can log into the web application by entering email & password after installing the application.	I can access the dashboard by login into the application	High	Sprint-1
	Dashboard	USN-6	As a user, I can view the charts and graphs representation of the dataset and the information shown in the dashboard.	I can analyse the stocks in my retail store.	High	Sprint-1
Customer care Executive		CCE-1	As a customer care executive, I will always be available for the interaction with the customer to clarify the queries.	An executive will analyse the customer complaints, rectify their problems	High	Sprint-2
Administrator		ADMIN-1	As an administrator, I will manage backup and recovery, data modelling and design, distributed computing, database system, and a data security	Administrator can evaluate, design, review and implementing a data, they are also responsible for updating and maintaining the data.	High	Sprint-2

6. PROJECT PLANNING & SCHEDULING

Title	Description	Completed Date
Literature Survey & Information Gathering	Prepare Literature survey for the selected project & gathering information	27 SEPTEMBER 2022
Prepare Empathy Map	Prepare Empathy Map Canvas to capture the user Pains & Gains, Prepare list of problem statements	27 SEPTEMBER 2022
Ideation	List the by organizing the brainstorming session and prioritize the top 3 ideas based on the feasibility & importance.	27 SEPTEMBER 2022
Proposed Solution	Prepare the proposed solution document, which includes the novelty, feasibility of idea, business model, social impact, scalability of solution, etc.	10 OCTOBER 2022
Problem Solution Fit	Prepare problem - solution fit document.	10 OCTOBER 2022
Solution Architecture	Prepare solution architecture document	10 OCTOBER 2022
Customer Journey	Prepare the customer journey maps to understand the user interactions & experiences with the application (entry to exit)	10 OCTOBER 2022
Functional Requirement	Prepare the functional requirement document.	19 OCTOBER 2022
Data Flow Diagrams	Draw the data flow diagrams and submit for review.	19 OCTOBER 2022

Technology Architecture	Prepare the technology architecture diagram	19 OCTOBER 2022
Prepare Milestone & Activity List	Prepare the milestones & activity list of the project	27 OCTOBER 2022
Sprint delivery plan	Prepare the sprint delivery plan of the project	27 OCTOBER 2022
Project Development – Delivery of Sprint -1	Develop & submit the developed code by testing it	16 NOVEMBER 2022
Project Development - Delivery of Sprint-2	Develop & submit the developed code by testing it.	16 NOVEMBER 2022
Project Development - Delivery of Sprint-3	Develop & submit the developed code by testing it.	16 NOVEMBER 2022
Project Development - Delivery of Sprint-4	Develop & submit the developed code by testing it.	16 NOVEMBER 2022

6.1 Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story/Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user , I can register for the application by entering my email, password	**2**	**High**	Gowtham S Mohamed Fizal Rahman S Gurukarthikeyan M Surya R

Sprint-1	Data Preparation	USN-2	As a user, I can view the visualized data to get the better understanding	**3**	**Medium**	Gowtham S Mohamed Fizal Rahman S
Sprint-2	Data Exploration	USN-3	About the sales, stock, revenue And price.	**8**	**High**	Gurukarthikeyan M Surya R
Sprint-3	Dashboard Creation	USN-4	As a user, I can view the different visualization in the dashboard.	**8**	**High**	Gowtham S Mohamed Fizal Rahman S Gurukarthikeyan M Surya R
Sprint-4	Report Creation	USN-5	As a user, I can view the detailed report of the sales, stock, revenue and price. The user can get the report of the particular data**.**	**8**	**High**	Gowtham S Mohamed Fizal Rahman S Gurukarthikeyan M Surya R
Sprint-4	Story Creation	USN-6	As a user, I can view the story to get the better understanding of the sales, stock,revenue and price. The user can make decisions based on the story.	**8**	**High**	Gowtham S Mohamed Fizal Rahman S Gurukarthikeyan M Surya R

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint -1	5	3 Days	05 Nov 2022	08 Nov 2022	5	08 Nov 2022
Sprint -2	8	3 Days	09 Nov 2022	12 Nov 2022	8	12 Nov 2022
Sprint -3	8	3 Days	13 Nov 2022	16 Nov 2022	8	16 Nov 2022
Sprint -4	16	2 Days	17 Nov 2022	19 Nov 2022	16	19 Nov 2022

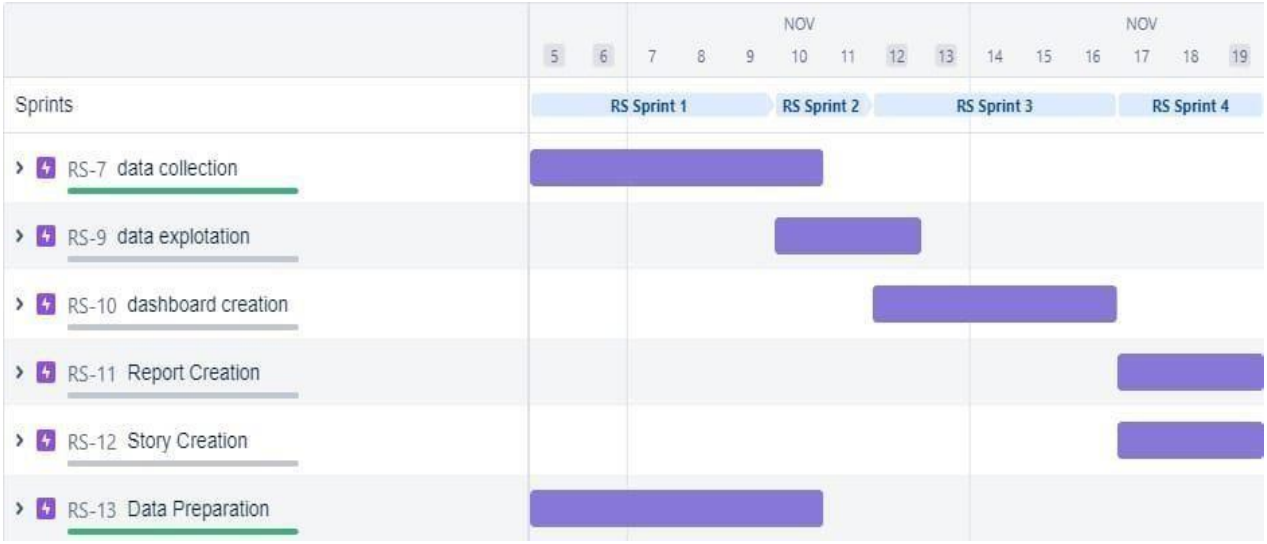
Project Tracker, Velocity & Burndown Chart: (4 Marks) Velocity:

Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day).

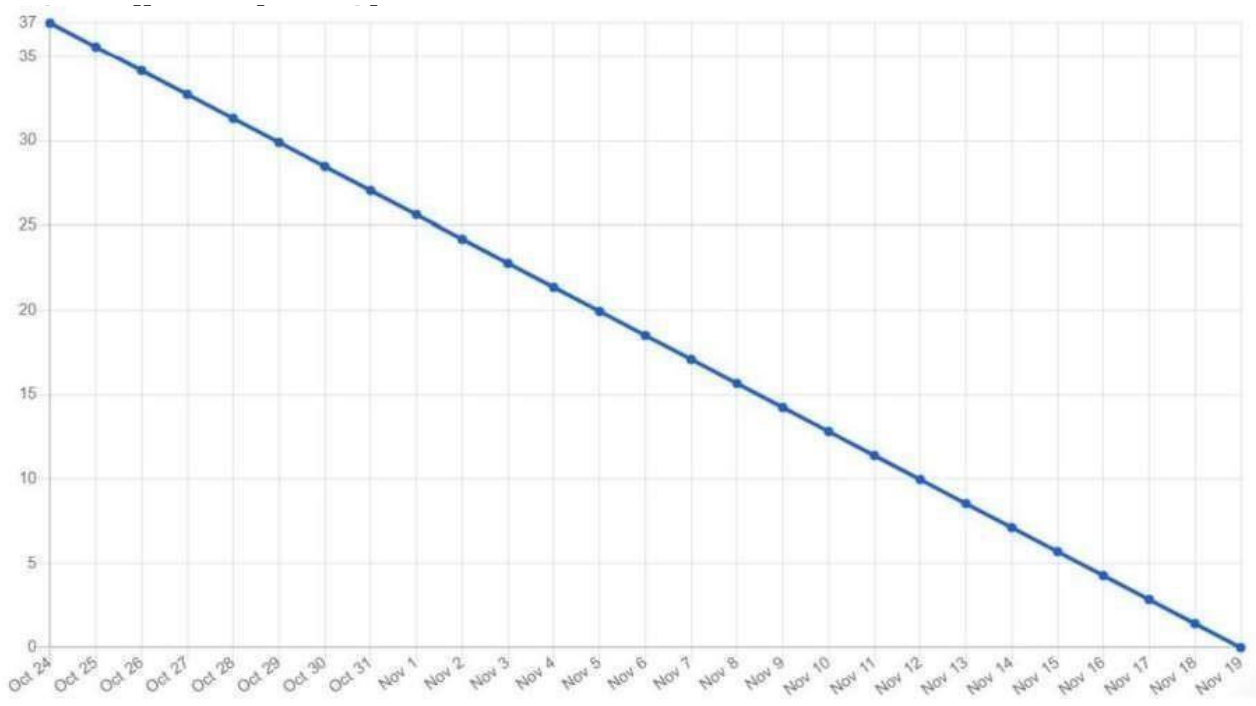
Sprint	Story Points	Duration	Average Velocity
Sprint-1	5	3	1.66
Sprint-2	8	3	2.66
Sprint-3	8	3	2.66
Sprint-4	16	2	8.0
Total	**37**	**11**	**3.36**

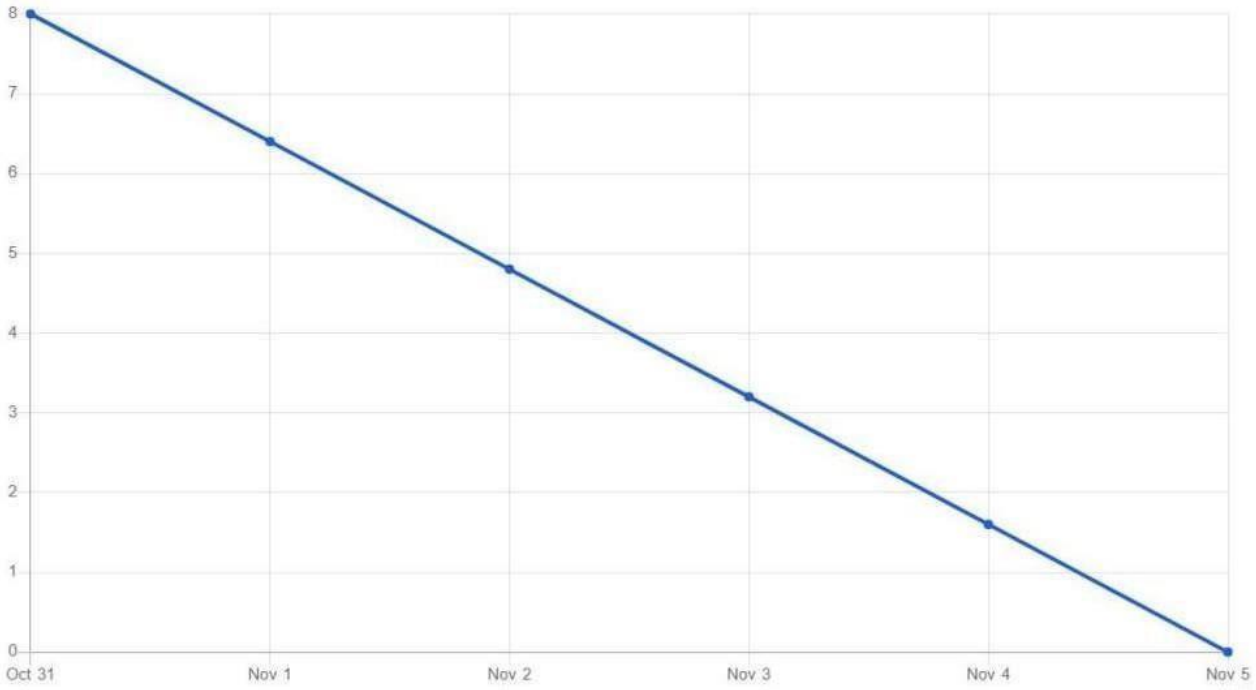
$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

Jira Project Planning:



Burn Down Chart:

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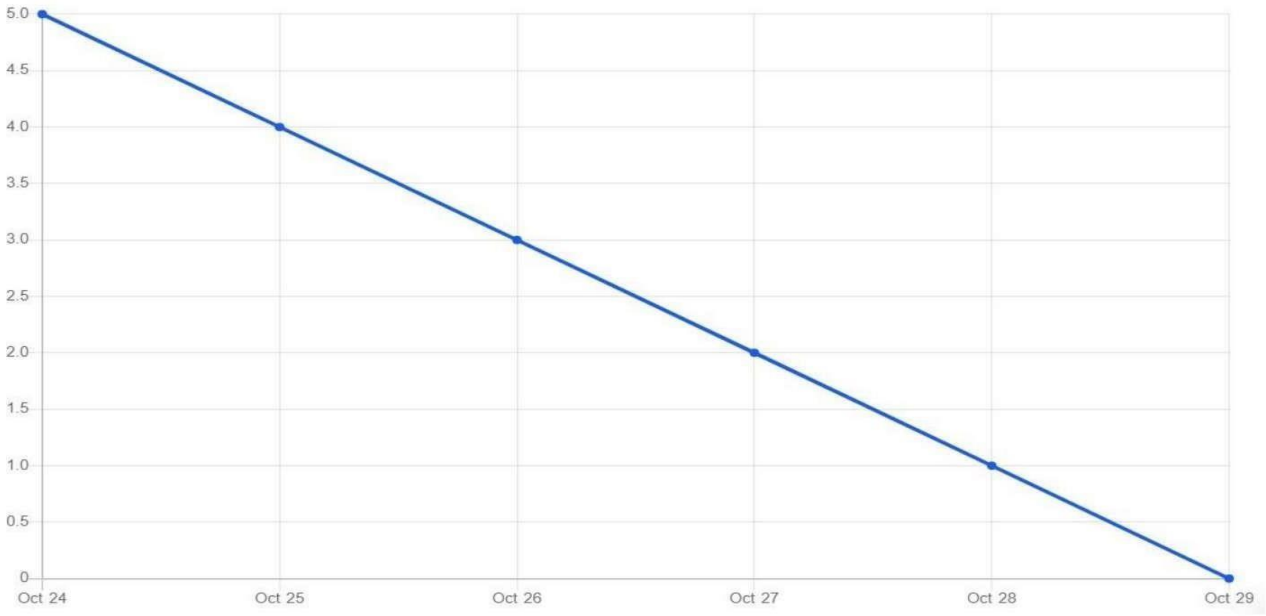
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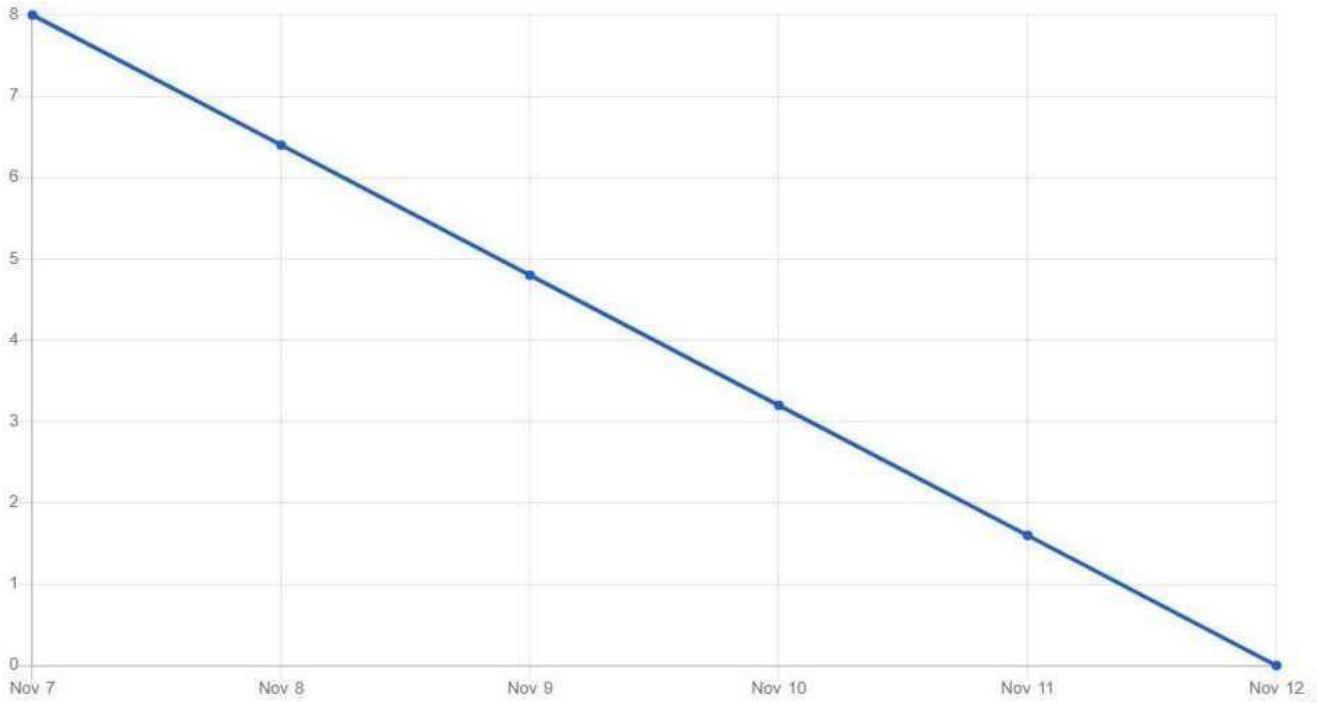
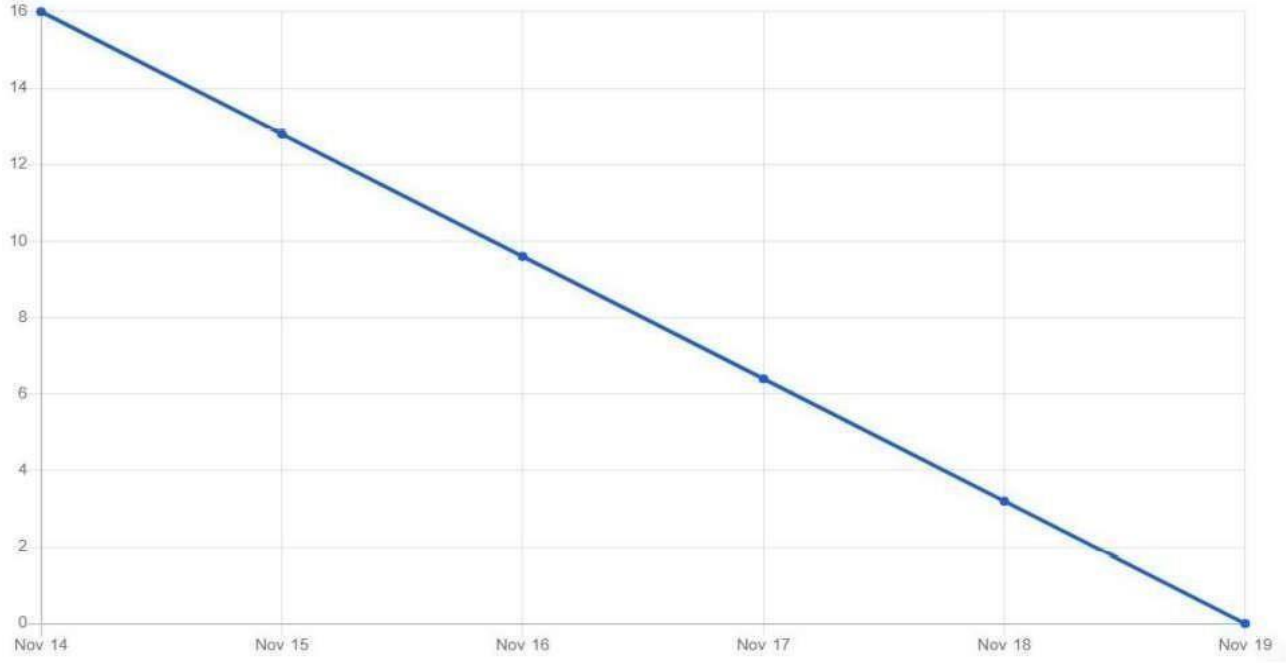


7. DELIVERY OF SPRINT 1

Project Development Phase:



Sprint-1:

- Data Collection
- Data Preparation

Sprint-2:

- Data Exploration

Sprint-3:

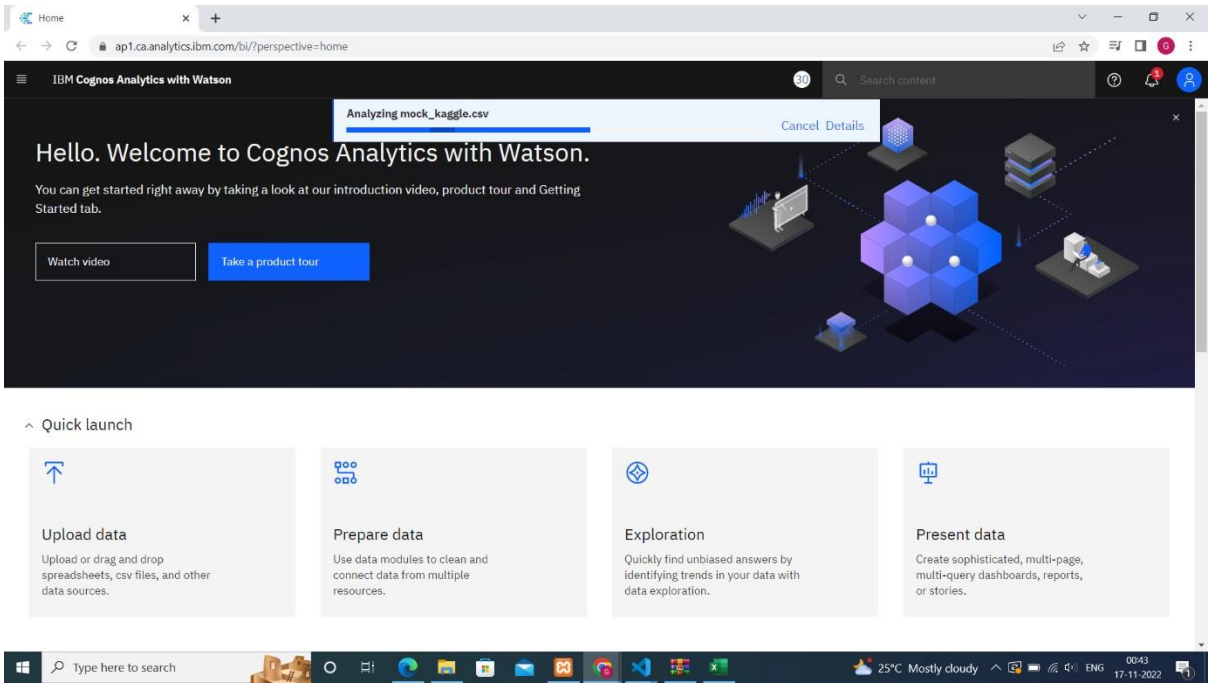
- Dashboard creation

Sprint-4:

- Report Creation

DATA COLLECTION

Download the Dataset



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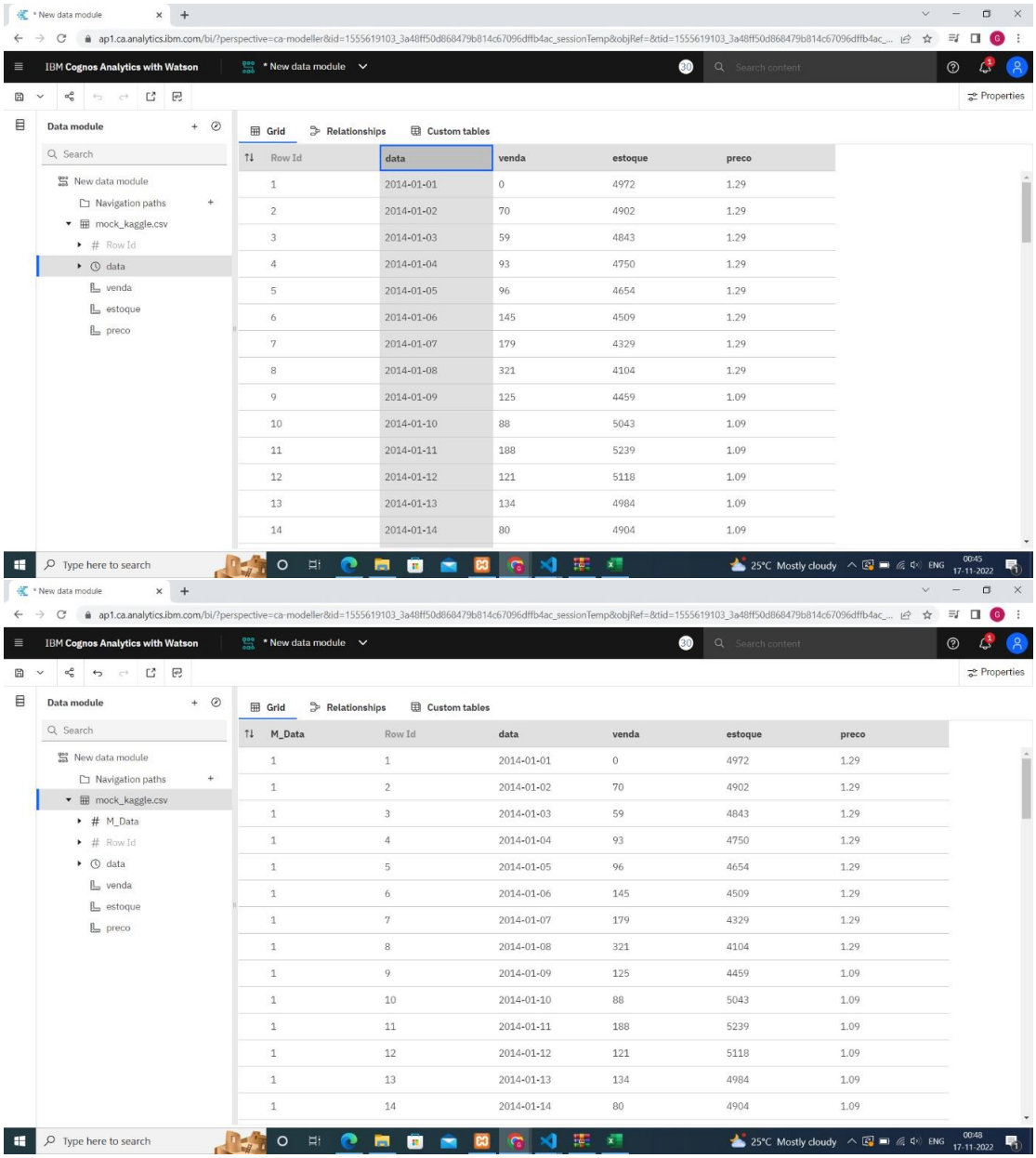

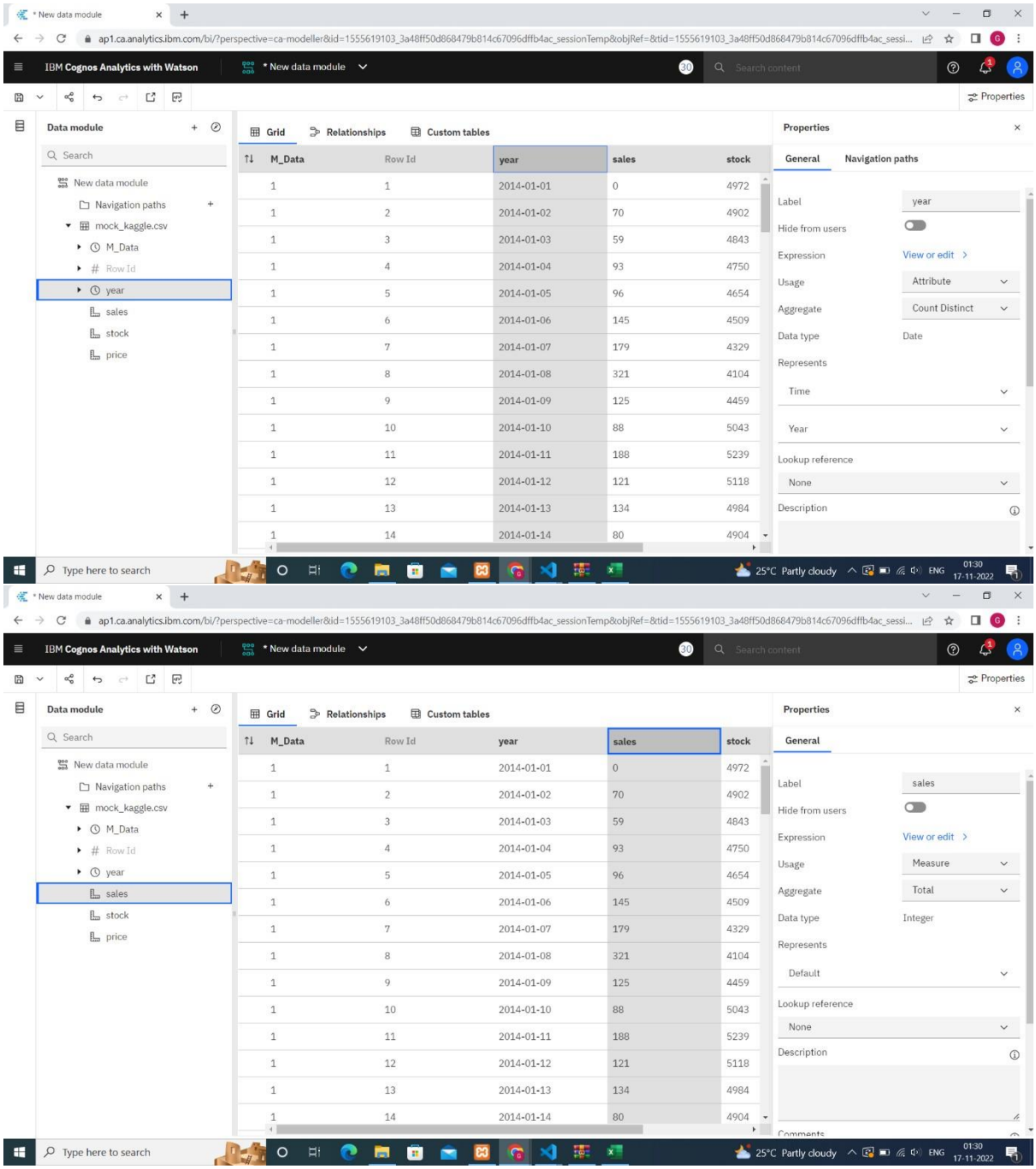
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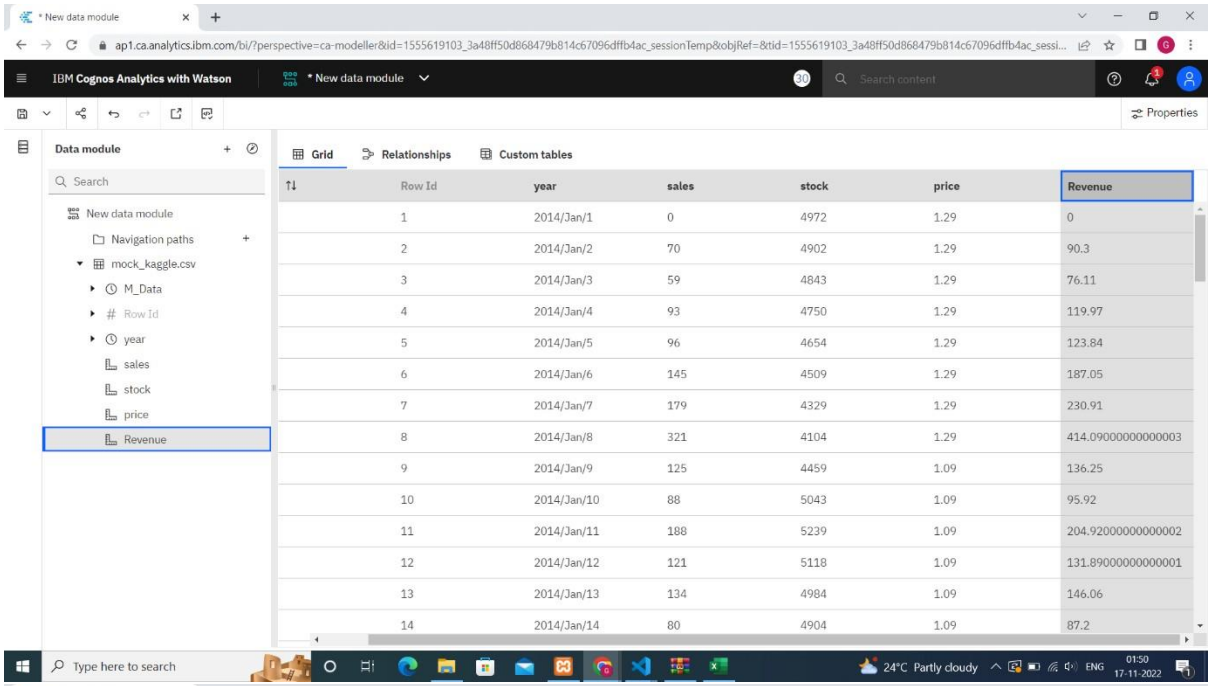
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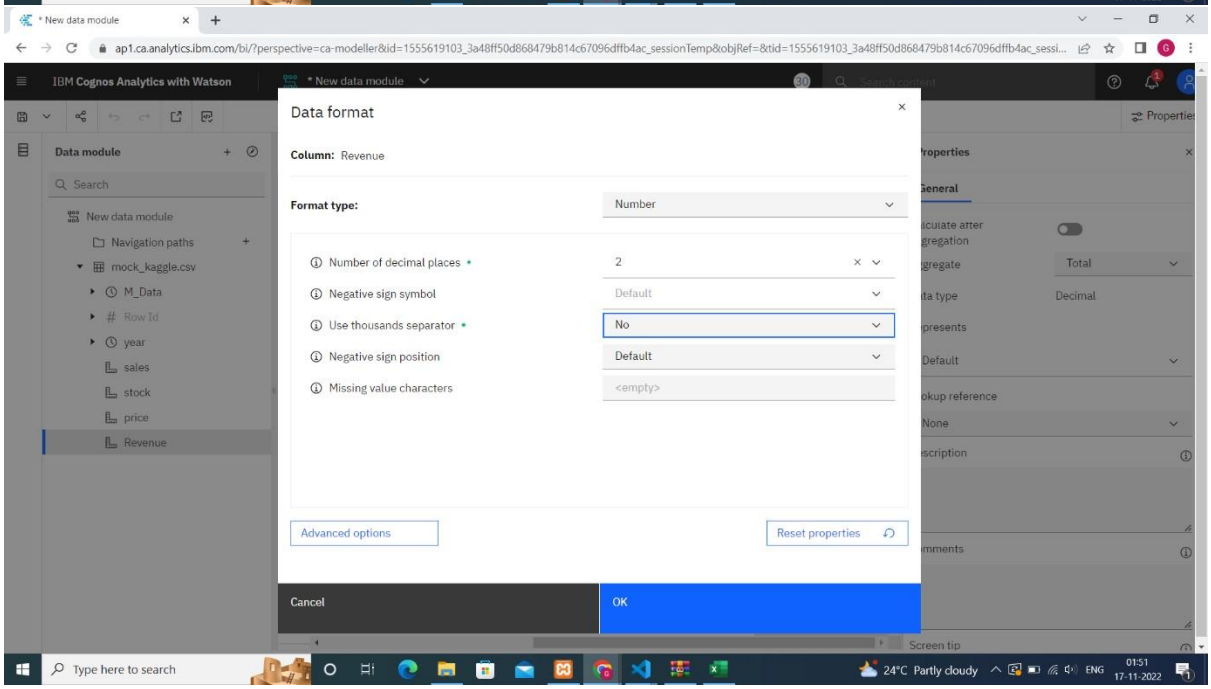
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IBM Cognos Analytics with Watson
* New data module
Data format
Column: Revenue
Format type:
Number
Number of decimal places *
2
Negative sign symbol
Default
Use thousands separator *
No
Negative sign position
Default
Missing value characters
<empty>
Advanced options
Reset properties
Cancel
OK
Properties
General
Total
Decimal
Default
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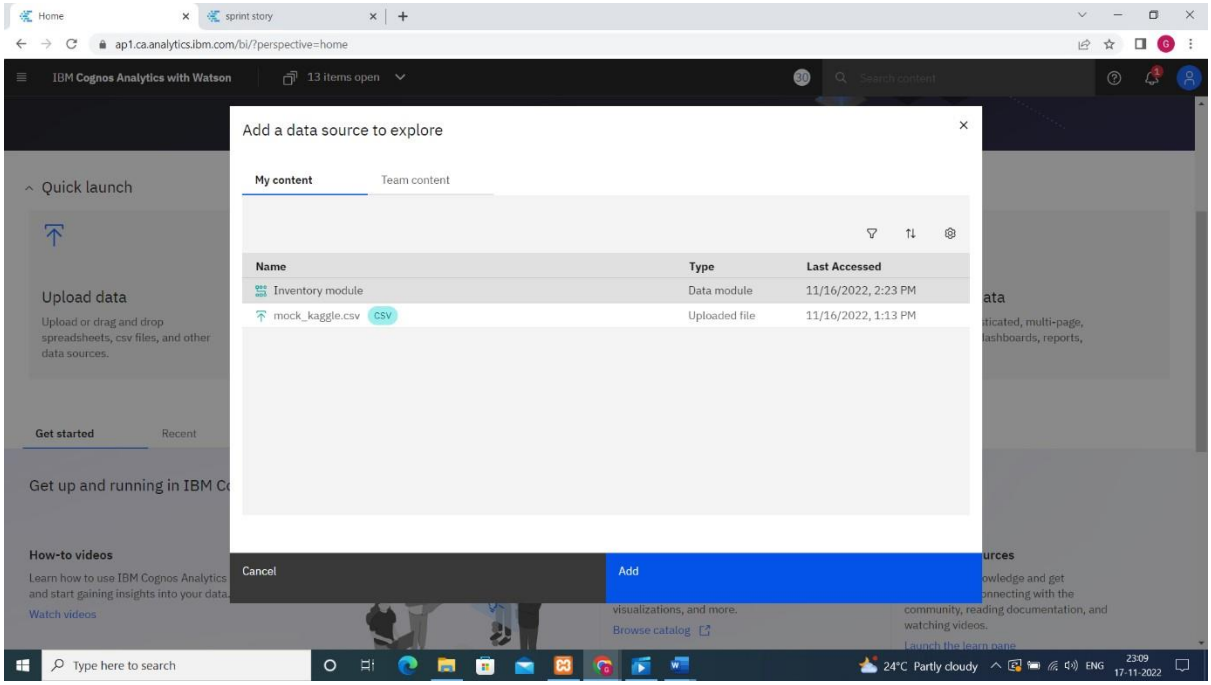
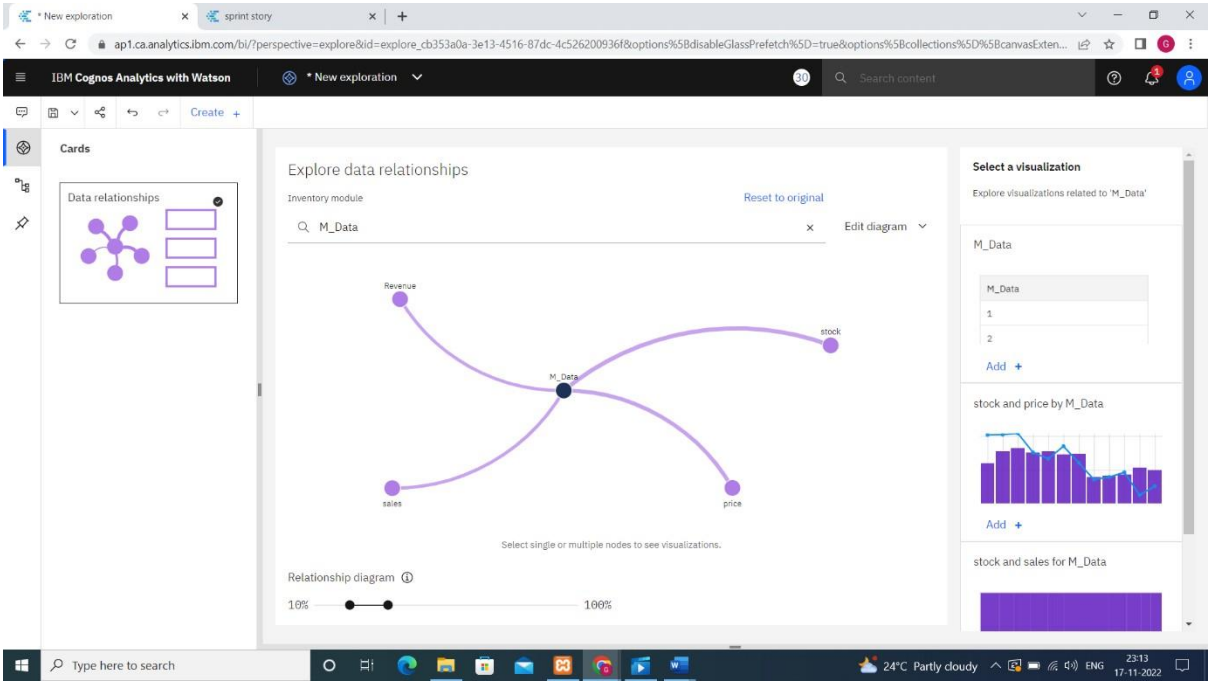
Screen tip
Type here to search
24°C Partly cloudy
ENG
01:51
17-11-2022

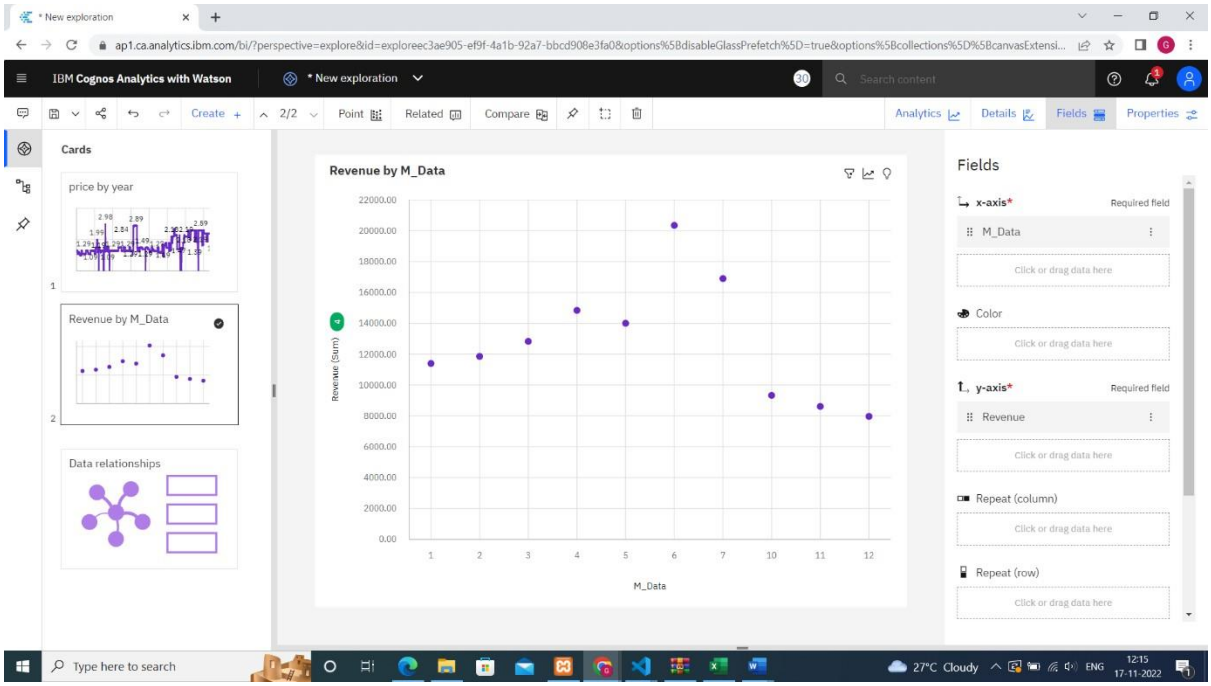
Sprint-2

- Data exploration

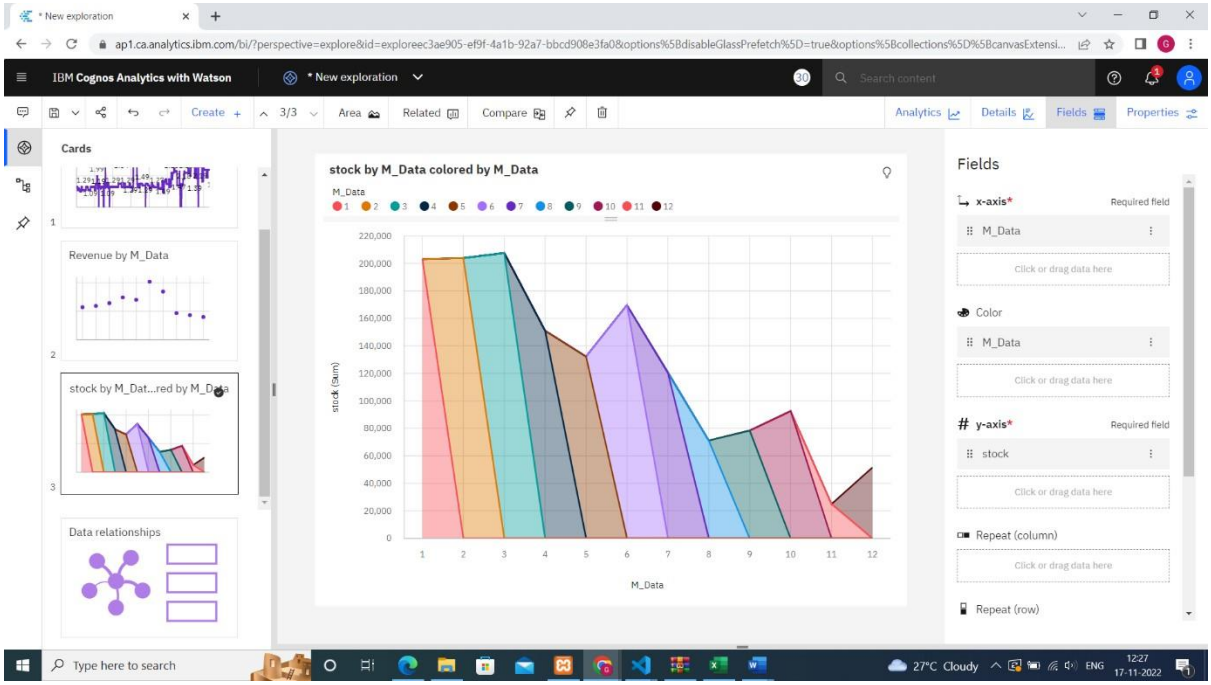




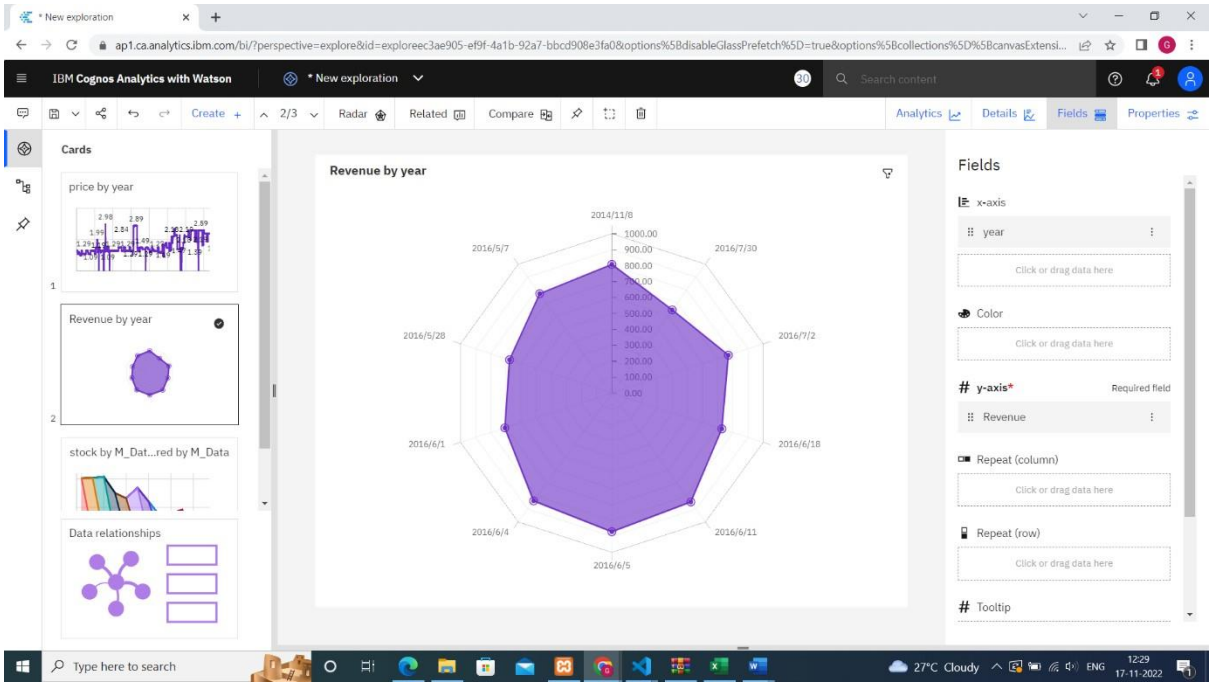
REVENUE BY MONTH:



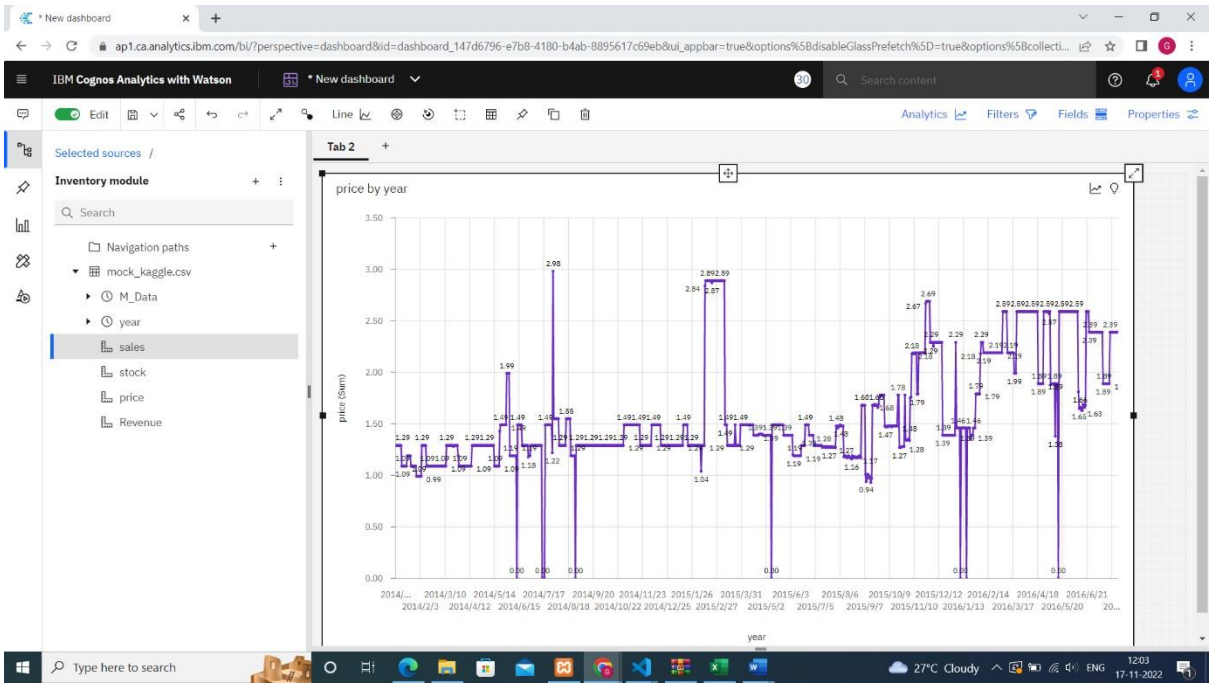
STOCK BY MONTH:



REVENUE BY YEAR:

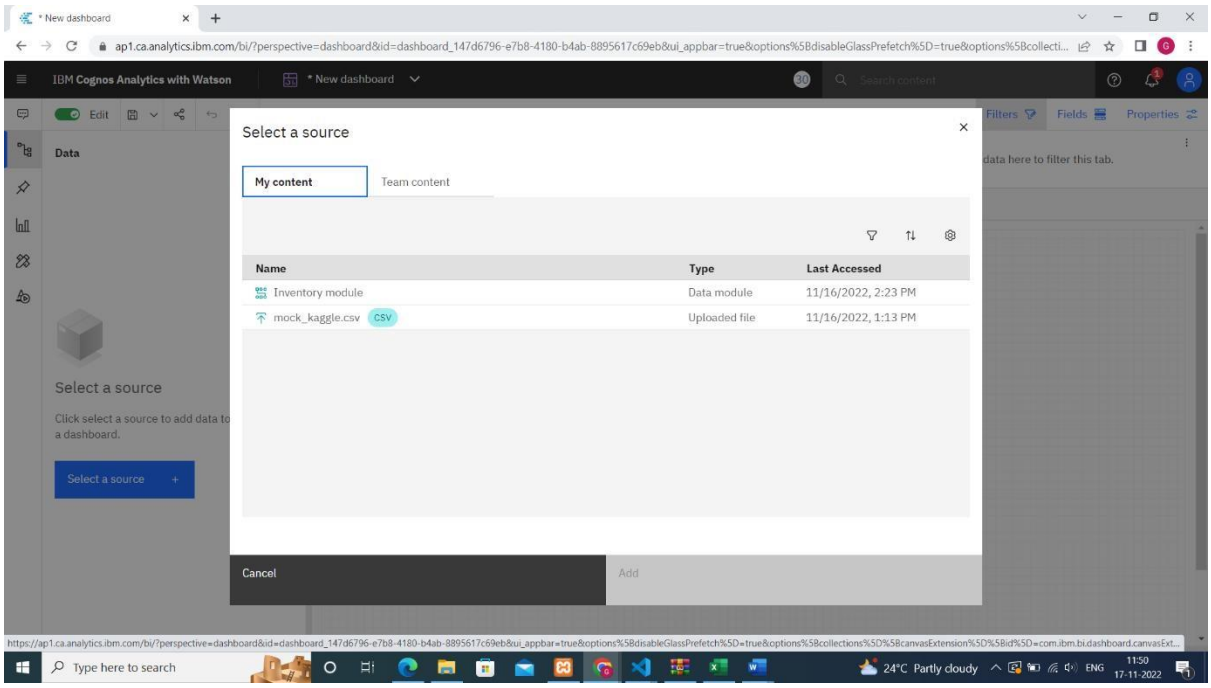


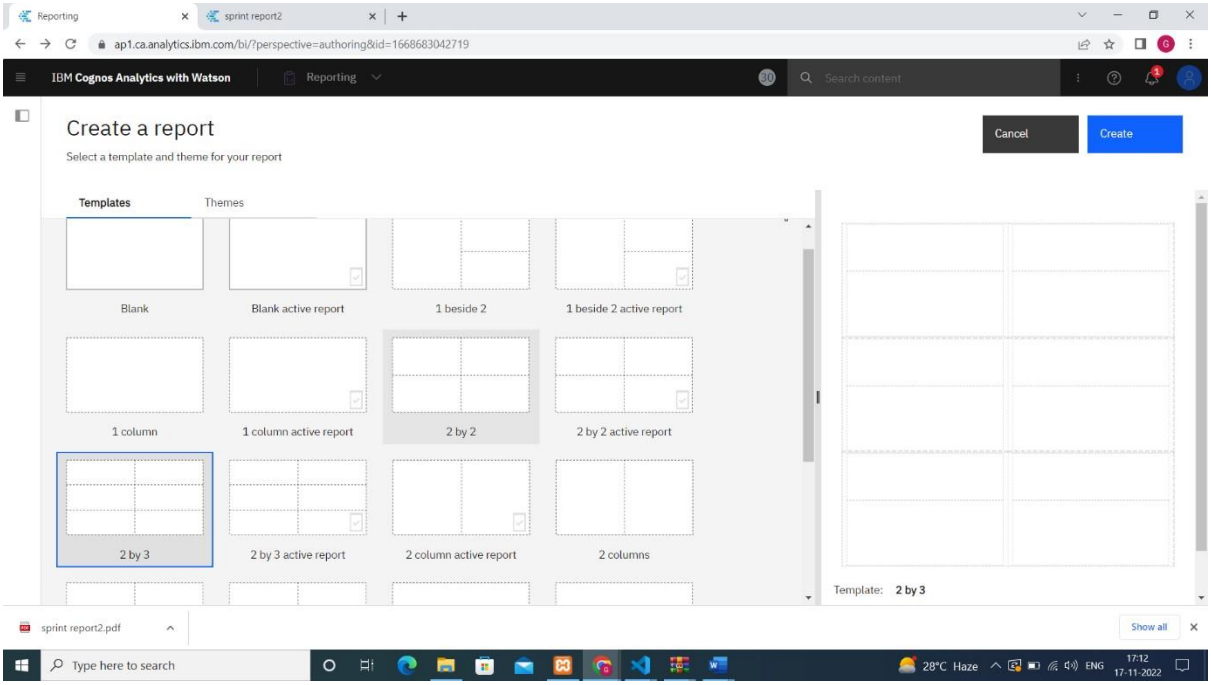
PRICE BY YEAR :

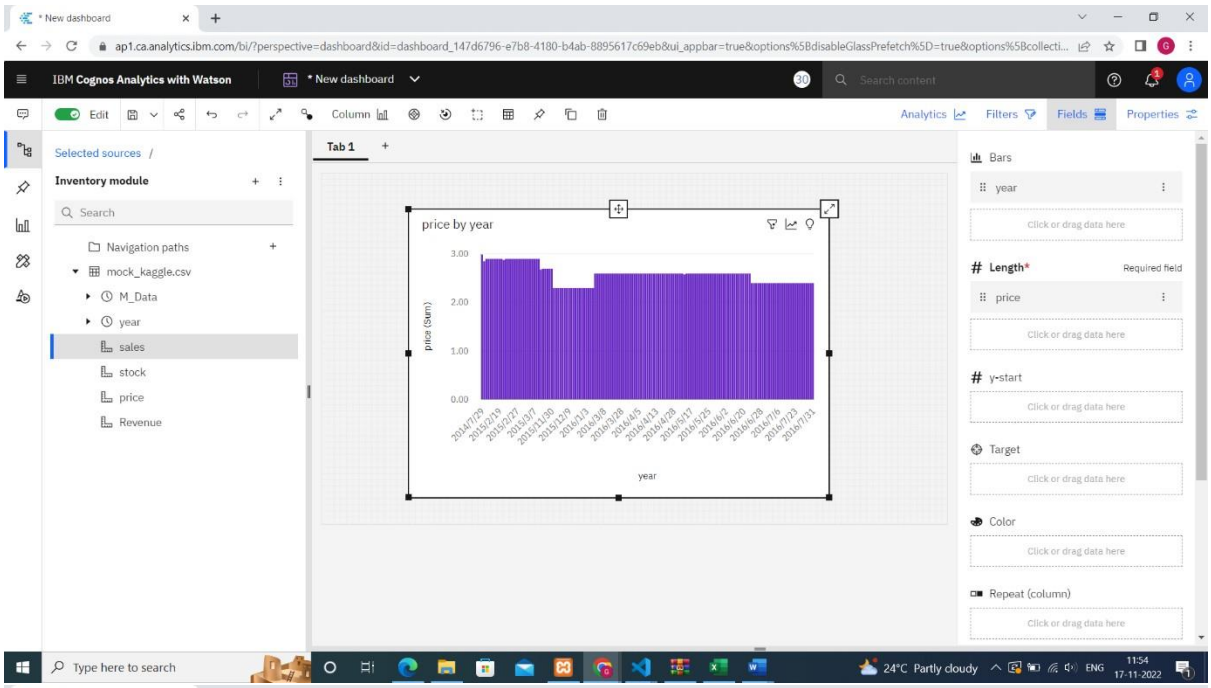


SPRINT-3

- Dashboard creation






* New dashboard
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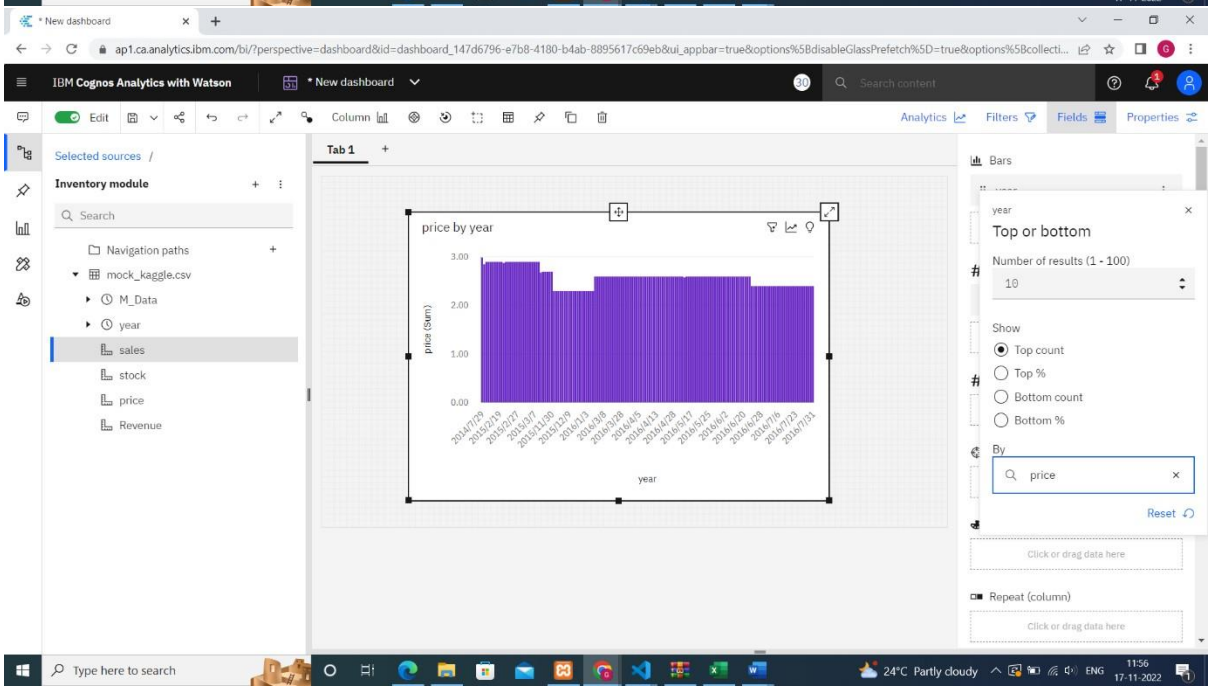
IBM Cognos Analytics with Watson
* New dashboard
Search content
Edit
Column
Analytics
Filters
Fields
Properties
Selected sources /
Inventory module
Search
Navigation paths
mock_kaggle.csv
M_Data
year
sales
stock
price
Revenue
Tab 1
price by year
price (Sum)
year
Bars
year
Click or drag data here
Length*
Required field
price
y-start
Target
Color
Repeat (column)
Type here to search
24°C Partly cloudy
ENG
11:54
17-11-2022


* New dashboard
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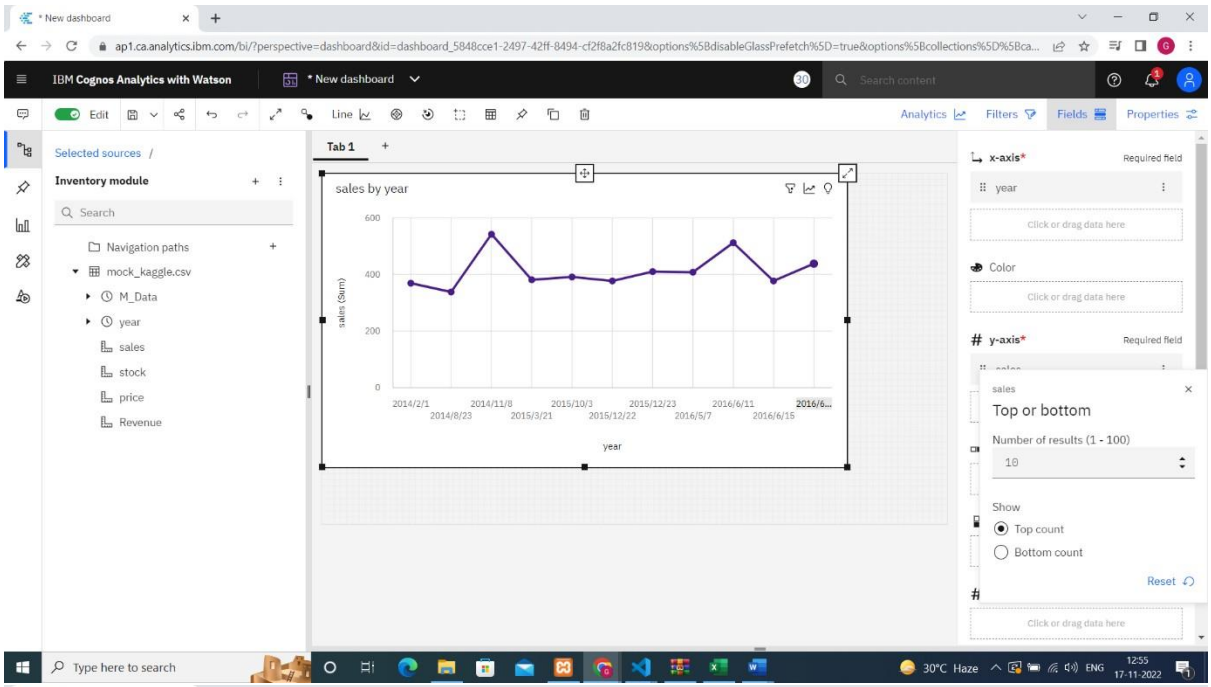
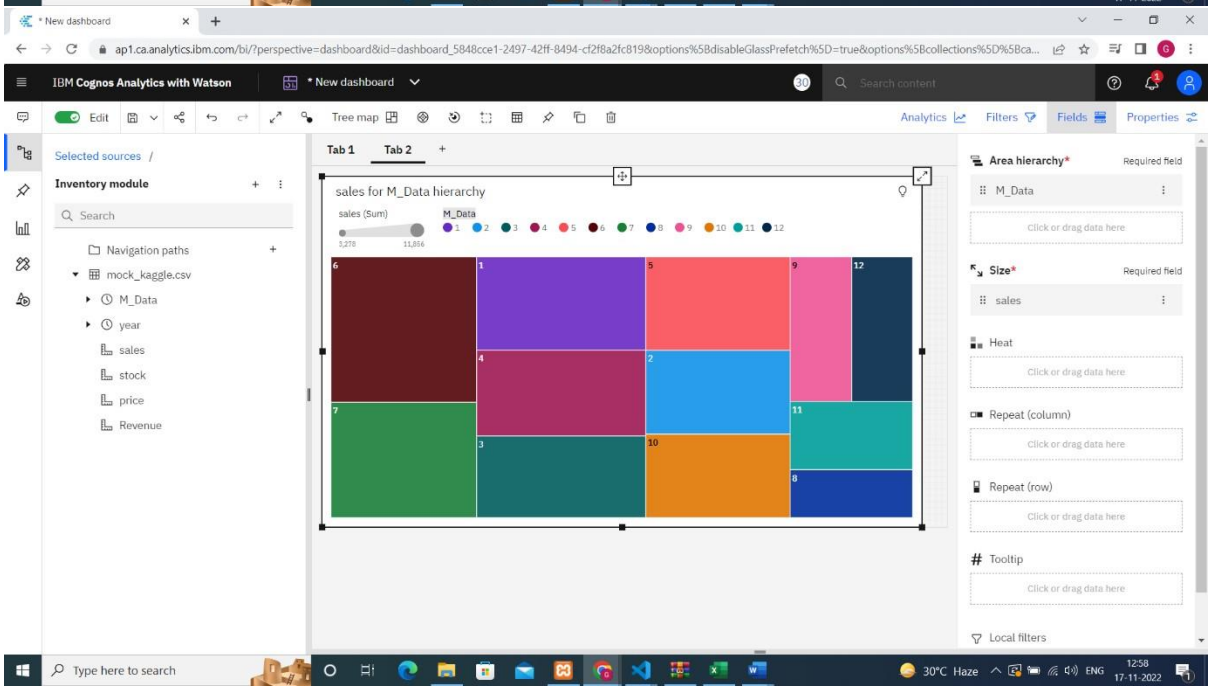
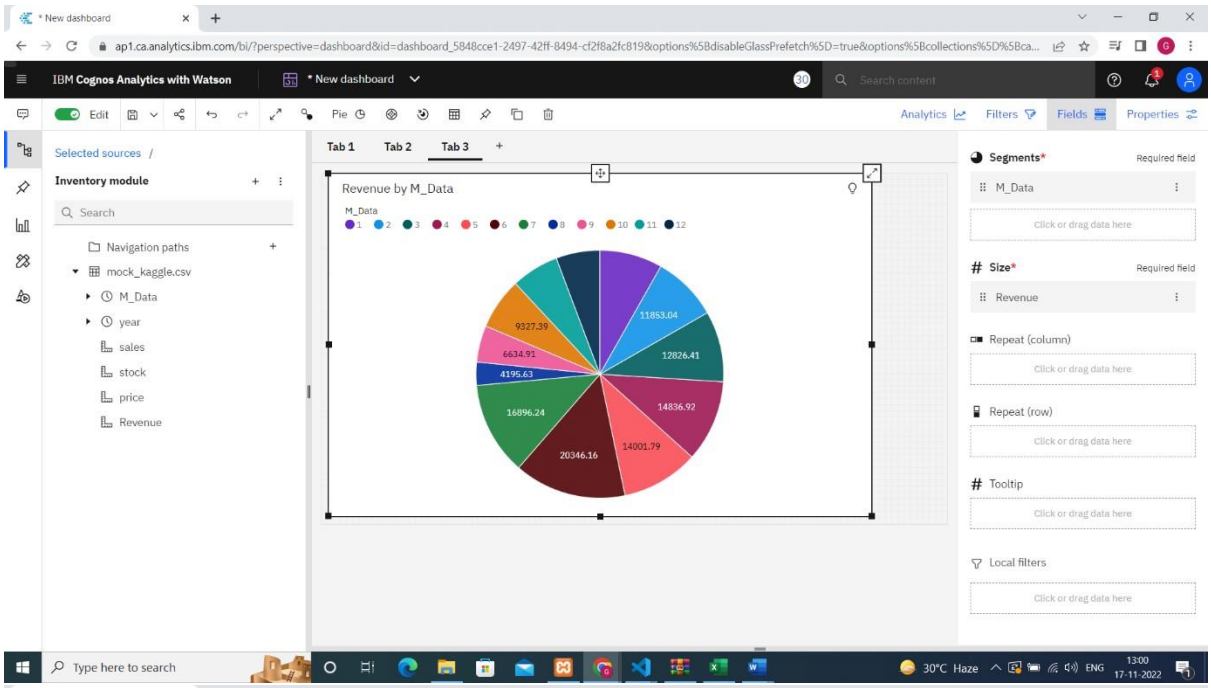
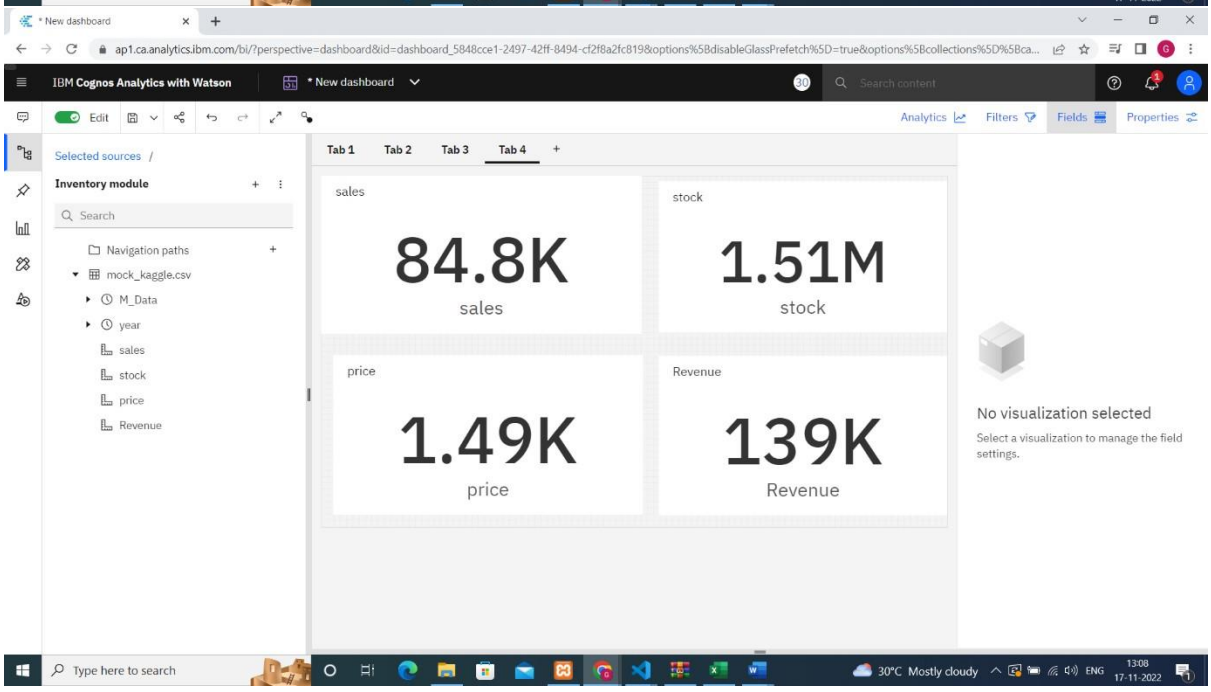
IBM Cognos Analytics with Watson
* New dashboard
Search content
Edit
Column
Analytics
Filters
Fields
Properties
Selected sources /
Inventory module
Search
Navigation paths
mock_kaggle.csv
M_Data
year
sales
stock
price
Revenue
Tab 1
price by year
price (Sum)
year
Bars
year
Top or bottom
Number of results (1 - 100)
10
Show
Top count
Top %
Bottom count
Bottom %
By
price
Reset
Click or drag data here
Repeat (column)
Type here to search
24°C Partly cloudy
ENG
11:56
17-11-2022


* New dashboard
IBM Cognos Analytics with Watson
* New dashboard
Search content
Edit
Line
Analytics
Filters
Fields
Properties
Selected sources
Inventory module
Search
Navigation paths
mock_kaggle.csv
M_Data
year
sales
stock
price
Revenue
Tab 1
sales by year
sales (Sum)
year
x-axis*
Required field
Color
y-axis*
Top or bottom
Number of results (1 - 100)
10
Show
Top count
Bottom count
Reset
Type here to search
30°C Haze
ENG
12:55
17-11-2022


* New dashboard
IBM Cognos Analytics with Watson
* New dashboard
Search content
Edit
Tree map
Analytics
Filters
Fields
Properties
Selected sources
Inventory module
Search
Navigation paths
mock_kaggle.csv
M_Data
year
sales
stock
price
Revenue
Tab 1
Tab 2
sales for M_Data hierarchy
sales (Sum)
M_Data
Area hierarchy*
Required field
M_Data
Size*
sales
Heat
Repeat (column)
Repeat (row)
Tooltip
Local filters
Type here to search
30°C Haze
ENG
12:58
17-11-2022


* New dashboard
IBM Cognos Analytics with Watson
* New dashboard
Edit
Pie
Analytics
Filters
Fields
Properties
Selected sources
Inventory module
Search
Navigation paths
mock_kaggle.csv
M_Data
year
sales
stock
price
Revenue
Tab 1
Tab 2
Tab 3
Revenue by M_Data
M_Data
11853.04
12826.41
14836.92
14001.79
20346.16
16896.24
4195.63
6634.91
9327.39
Segments*
Required field
M_Data
Click or drag data here
Size*
Revenue
Repeat (column)
Repeat (row)
Tooltip
Local filters
Type here to search
30°C Haze
ENG
13:00
17-11-2022


* New dashboard
IBM Cognos Analytics with Watson
* New dashboard
Edit
Analytics
Filters
Fields
Properties
Selected sources
Inventory module
Search
Navigation paths
mock_kaggle.csv
M_Data
year
sales
stock
price
Revenue
Tab 1
Tab 2
Tab 3
Tab 4
sales
84.8K
sales
stock
1.51M
stock
price
1.49K
price
Revenue
139K
Revenue
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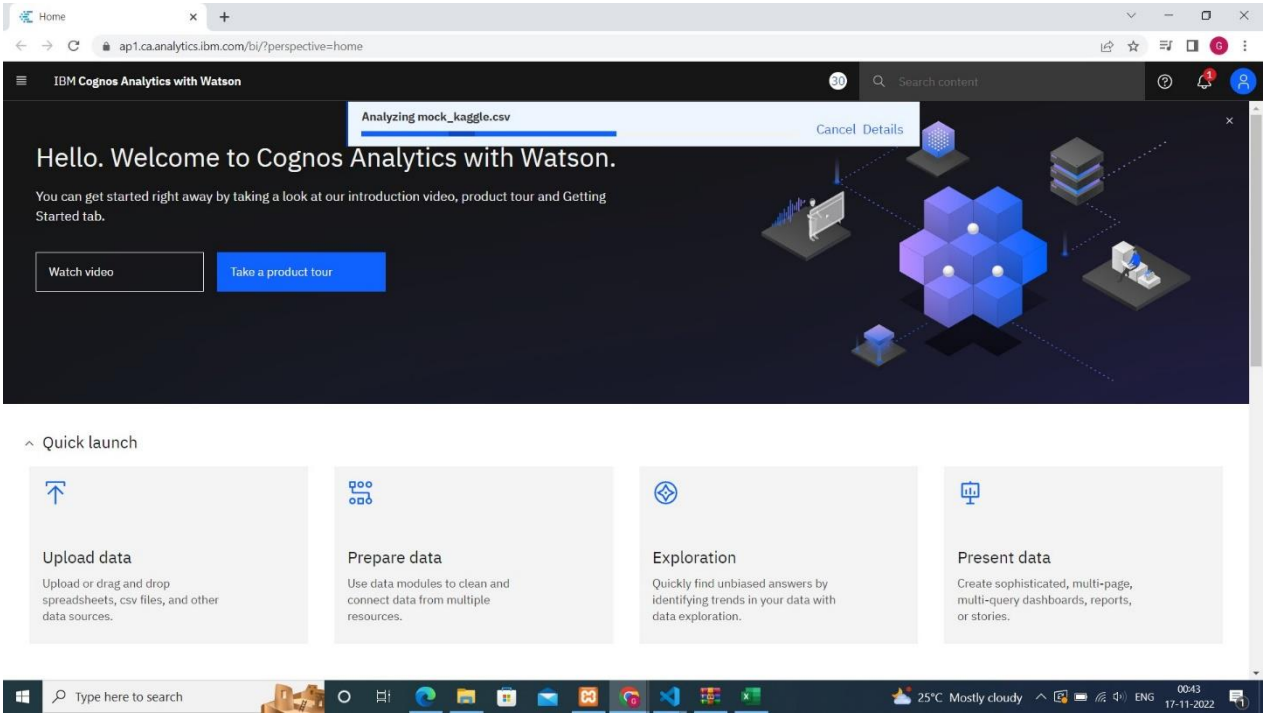
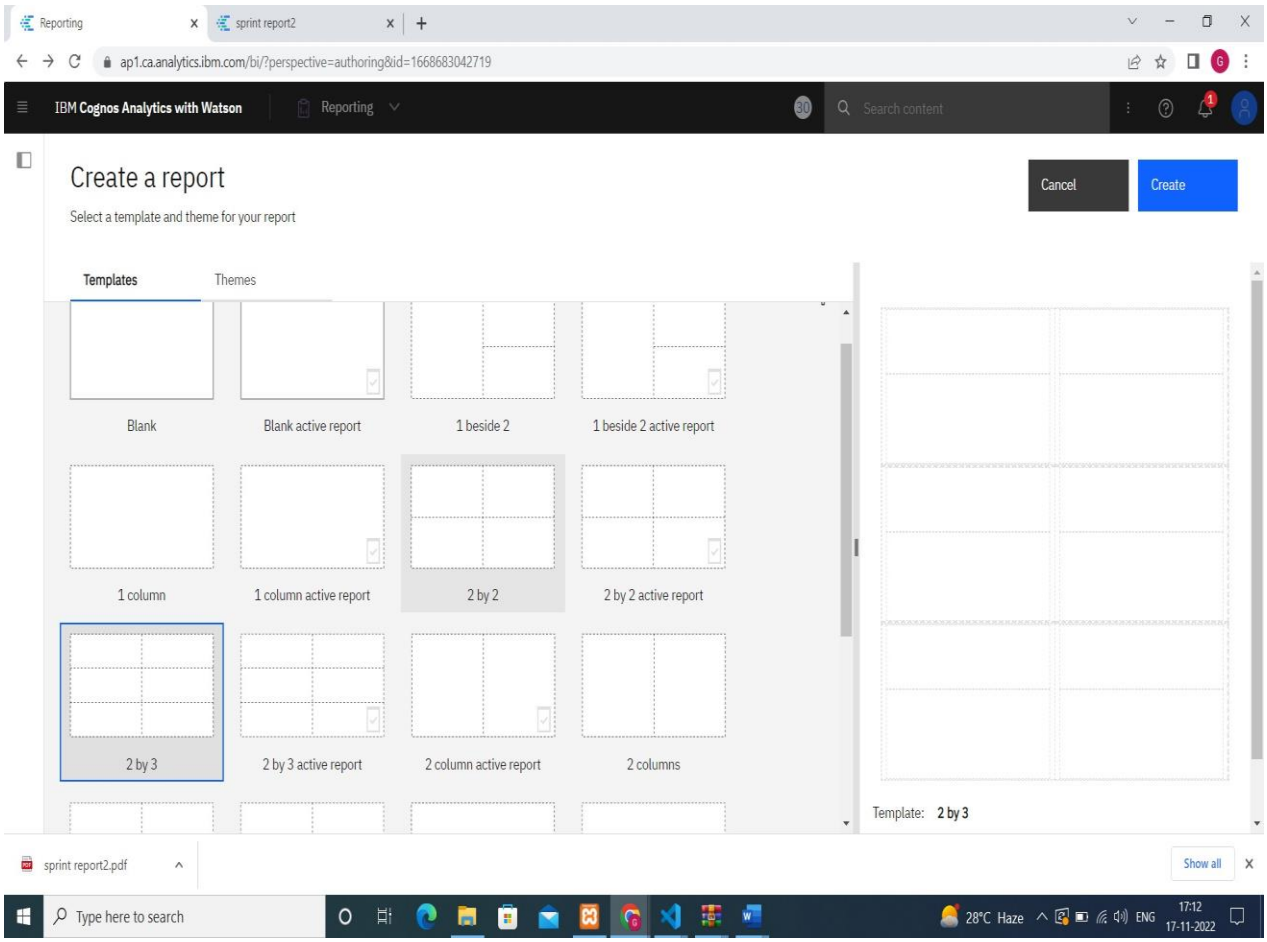
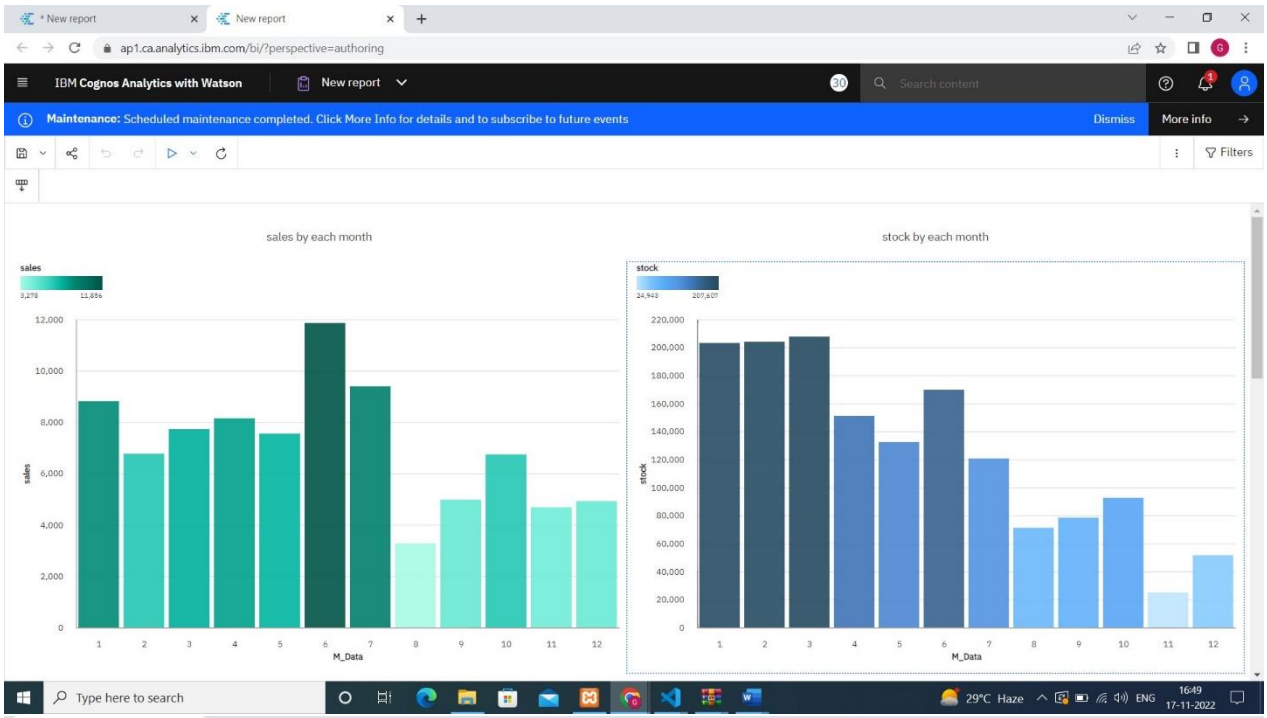
Select a visualization to manage the field settings.
Type here to search
30°C Mostly cloudy
ENG
13:08
17-11-2022

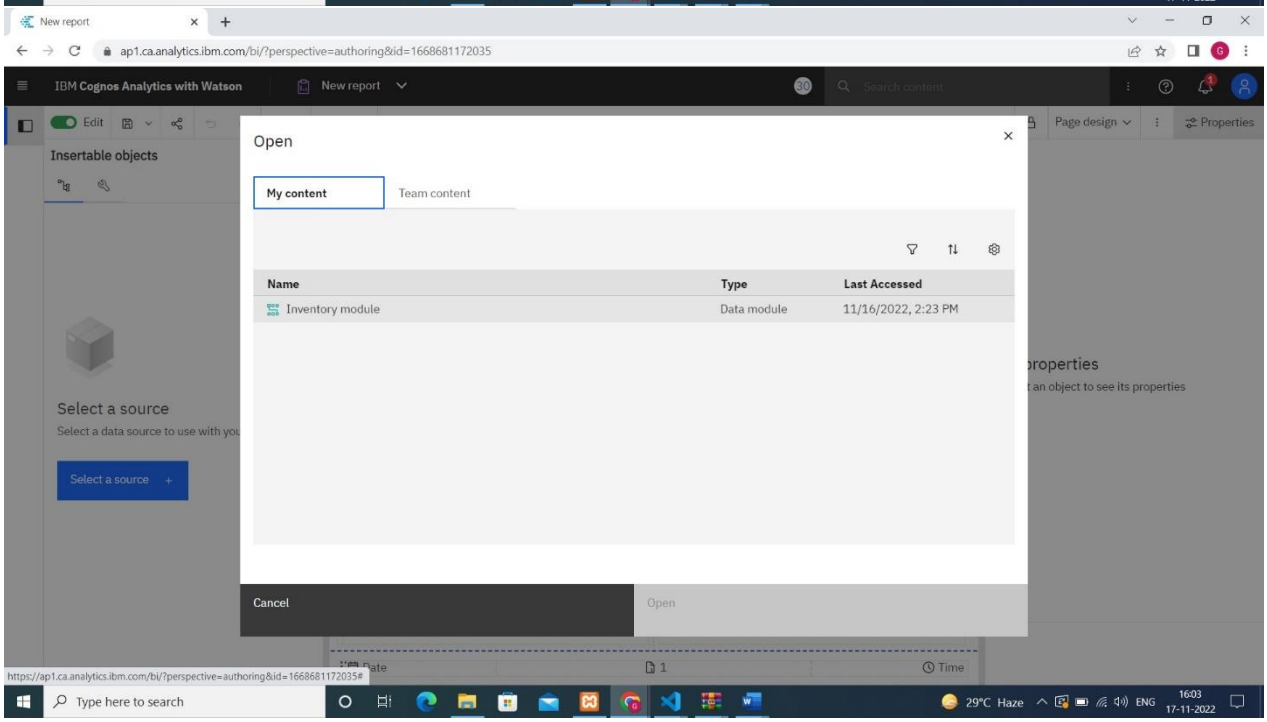
SPRINT – 4

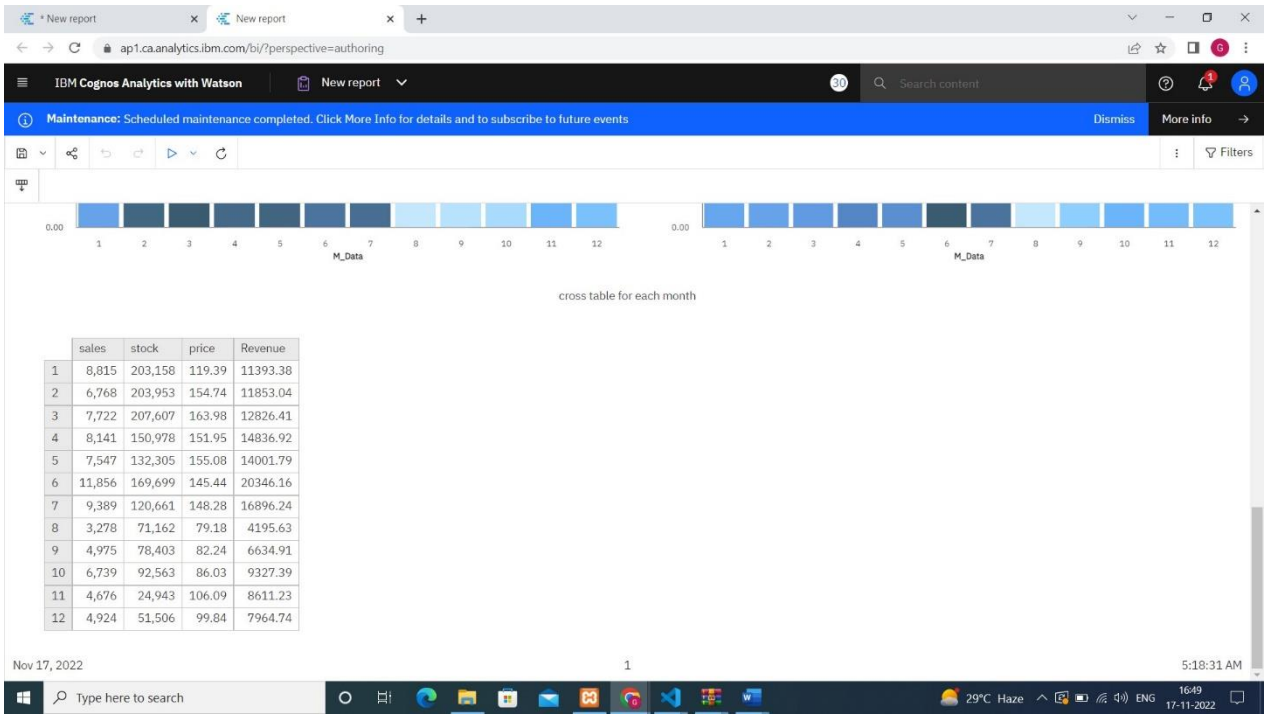
Report creation



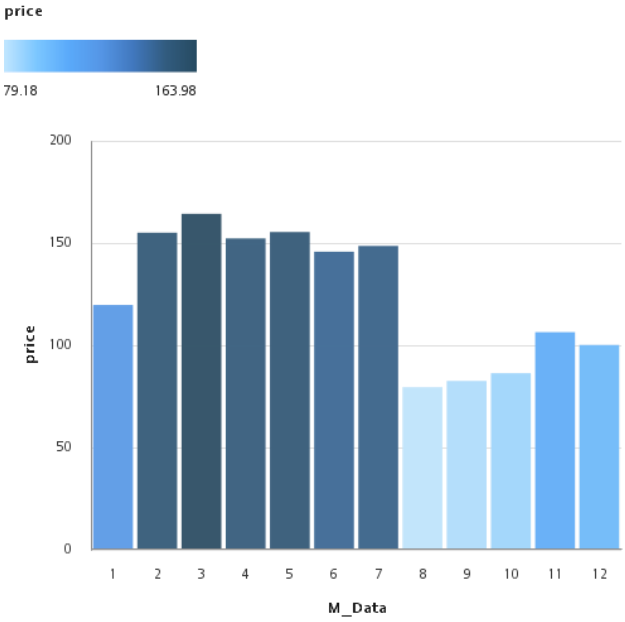

Reporting
sprint report2
ap1.ca.analytics.ibm.com/bi/?perspective=authoring&id=1668683042719
IBM Cognos Analytics with Watson
Reporting
Search content
Create a report
Select a template and theme for your report
Cancel
Create
Templates
Themes
Blank
Blank active report
1 beside 2
1 beside 2 active report
1 column
1 column active report
2 by 2
2 by 2 active report
2 by 3
2 by 3 active report
2 column active report
2 columns
Template: 2 by 3
sprint report2.pdf
Show all
Type here to search
28°C Haze
ENG
17:12
17-11-2022

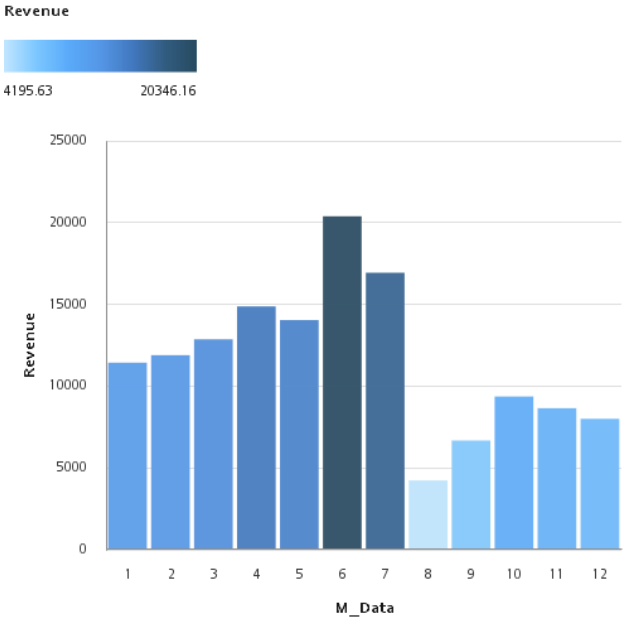

New report
ap1.ca.analytics.ibm.com/bi/?perspective=authoring
IBM Cognos Analytics with Watson
New report
Search content
Maintenance: Scheduled maintenance completed. Click More Info for details and to subscribe to future events
Dismiss
More info
Filters
sales by each month
stock by each month
sales
stock
M_Data
Type here to search
29°C Haze
ENG
16:49
17-11-2022


New report
ap1.ca.analytics.ibm.com/bi/?perspective=authoring&id=1668681172035
IBM Cognos Analytics with Watson
New report
Edit
Page design
Properties
Insertable objects
Open
My content
Team content
Name
Type
Last Accessed
Inventory module
Data module
11/16/2022, 2:23 PM
Select a source
Select a data source to use with you
Select a source
Cancel
Open
Time
https://ap1.ca.analytics.ibm.com/bi/?perspective=authoring&id=1668681172035#
Type here to search
29°C Haze
ENG
16:03
17-11-2022



	sales	stock	price	Revenue
1	8,815	203,158	119.39	11393.38
2	6,768	203,953	154.74	11853.04
3	7,722	207,607	163.98	12826.41
4	8,141	150,978	151.95	14836.92
5	7,547	132,305	155.08	14001.79
6	11,856	169,699	145.44	20346.16
7	9,389	120,661	148.28	16896.24
8	3,278	71,162	79.18	4195.63
9	4,975	78,403	82.24	6634.91
10	6,739	92,563	86.03	9327.39
11	4,676	24,943	106.09	8611.23
12	4,924	51,506	99.84	7964.74





Cross table for each month

	sales	stock	price	Revenue
1	8,815	203,158	119.39	11393.38
2	6,768	203,953	154.74	11853.04
3	7,722	207,607	163.98	12826.41
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8	3,278	71,162	79.18	4195.63
9	4,975	78,403	82.24	6634.91
10	6,739	92,563	86.03	9327.39
11	4,676	24,943	106.09	8611.23
12	4,924	51,506	99.84	7964.74

CONCLUSION:

The retail shop managers must develop a cutting-edge method of managing the inventory by putting in place electronic systems to look after the company's resources if they want the program to succeed.

By doing this, it is ensured that they can be identified and that accurate data are constantly accessible for use when necessary. Additionally, the retail management system is essential to ensure that the corporation manages its supply with responsibility. Saving time is a benefit.

Due to their considerable economic impact, retail businesses have grown to be quite important in many nations. As a result, it is crucial to examine their KPIs as well as the various tools, processes, and systems they employ for inventory management and optimization. The primary trends in inventory management within businesses were identified from the aforementioned factors