Academia International College

Tribhuvan University

Institute of Science and Technology

Case Study On

"Diet Recommendation System – Smart Diet"

Submitted to

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In Partial Fulfillment of the Requirement for the Bachelor Degree in Computer Science and Information Technology

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1. Introduction

1.1. Introduction

“Smart Diet” is a web-based application designed to help people with a desire for formulation of healthy lifestyle. Users can adjust their personal diet plan. The main features of the application are detailed information about each meal and user-friendly interface. The system is designed for people who are urged to maintain their fitness and health. We have to consider their age, gender, physical activity and nutritional values.

A balanced diet is one that provides the body with all the essential nutrients it needs to function properly. Food recommendation applications that use a content-based approach are important for promoting healthy eating habits. Such applications use information about nutrition and ingredients of foods in order to make personalized recommendations. The main advantage of a content-based approach is that it takes into account dietary restrictions and preferences, including allergies and food preferences, of an individual. In addition to helping users make better choices regarding what to eat, a content-based food recommendation application can also improve their overall health by providing tailored recommendations.

1.2. Objectives

The objective of the project is to provide user-centered, and effective diet plan that can help to improve the health of people, to decrease the health burden caused by the poor diet and promote healthier lifestyle. The objectives of a Smart Diet include:

- To achieve specific health goals.
- To design an application to recommend personalized diet plan.

2. Project Analysis

2.1. Process Analysis

Process analysis helps in identifying the obstacles that may occur throughout the project execution. A proper project analysis can save the time of the organization up to a great extent. There are two criteria for analysis: Strategic Assessment and Technical Assessment. Where, Strategic assessment stands for evaluating and managing project and hence deals with what do we do? , for whom do we do it? Lastly, how do we excel. Likewise, Technical assessment involves providing an organization with information about the profitability of current technology as well as the benefits of implementing new technology.

2.2. Budget Analysis

The budgetary analysis identifies the components of budget expenditure and revenue in a budget. It includes economic assessment which can be done in following ways:

- Present Worth Analysis
- Future Worth Analysis
- Annual Worth Analysis
- Internal Rate of Return
- Payback period
- Net Profit
- Uniform Gradient Cash Flow

2.2.1. Present worth Analysis

Present value (PV) is the current value of an expected future stream of cash flow. The formula to calculate the present worth is as below:

Different Cashflow for n years

$$PW(i) = -P + C_1[\frac{1}{(1+i)^1}] + C_2[\frac{1}{(1+i)^2}] + C_j[\frac{1}{(1+i)^j}] + C_n[\frac{1}{(1+i)^n}] - S[\frac{1}{(1+i)^n}]$$

Uniform Cashflow

$(i) = -P + A(\text{P/A, i\%, n})$

Where, $(\text{P/A, i\%, n}) = [\frac{(1+\text{i})^{\text{n}}-1}{\text{i}*(1+\text{i})^{\text{n}}}]$

Here,

- P: Initial investment
- n: Number of years
- i: Interest Rate
- C: Cash inflow of a year , R for Revenue dominated cash flow
- A: Annual Cashflow/ Revenue
- S: Salvage Value

The formula for calculating PV in Excel is =PV(rate, nper, pmt, [fv], [type]).

If FV is omitted, PMT must be included, or vice versa, but both can also be included. The inputs for the present value (PV) formula in excel includes the following:

- RATE = Interest rate per period
- NPER = Number of payment periods
- PMT = Amount paid each period (if omitted—it's assumed to be 0 and FV must be included)
- [FV] = Future value of the investment (if omitted—it's assumed to be 0 and PMT must be included)
- [TYPE] = When payments are made (0, or if omitted—assumed to be at the end of the period, or 1—assumed to be at the beginning of the period)

2.2.2. Future worth Analysis

FV measures how much a given amount of money will be worth at a specific time in the future.

The formula to calculate the future worth is as below:

Different Cashflow for n years

$$FW(i) = -P(1+\mathrm{i})^{\mathrm{n}} + C_1(1+\mathrm{i})^{\mathrm{n}-1} + C_2(1+\mathrm{i})^{\mathrm{n}-2} + C_j(1+\mathrm{i})^{\mathrm{n}-\mathrm{j}} + {C_n}^{\mathrm{n}} + \mathrm{S}$$

Uniform Cashflow: $(i) = -P(\mathrm{F/P, i\%, n}) + A(\mathrm{F/A, i\%, n})$

Where, $(\mathrm{F/A, i\%, n}) = [\frac{(1+\mathrm{i})^{\mathrm{n}}-1}{\mathrm{i}}]$ and $(\mathrm{F/P, i\%, n}) = (1+\mathrm{i})^{\mathrm{n}}$

Here,

- P: Initial investment
- n: Number of years
- i: Interest Rate
- C: Cash inflow of a year, R for Revenue dominated cash flow
- A: Annual Cashflow/ Revenue
- S: Salvage Value

The FV syntax in excel is as follows:

FV(rate, nper, pmt, [pv], [type])

Where:

- RATE = Interest rate per period
- NPER = Number of payment periods
- PMT = Amount paid each period (if omitted—it's assumed to be 0 and PV must be included)
- [PV] = Present value of the investment (if omitted—it's assumed to be 0 and PMT must be included)
- [TYPE] = When payments are made (0, or if omitted—assumed to be at the end of the period, or 1—assumed to be at the beginning of the period)

2.2.3. Annual worth Analysis

The annual worth is the net of all the benefits and costs incurred over a one-year period. Therefore, we present the net of all the different benefits and costs incurred at different points of time in a one-year period with one number, and we call it the annual worth.

The formula to calculate the future worth is as below:

$AW = -(\text{A/P, i\%, n}) + \text{S(A/F, i\%, n)}$ or $AW = -(P - S)(\text{A/P, i\%, n}) - \text{S} * \text{i}$

Where, $(\text{A/P, i\%, n}) = [\frac{\text{i}*(1+\text{i})^{\text{n}}}{(1+\text{i})^{\text{n}}-1}]$ and $(\text{A/F, i\%, n}) = [\frac{\text{i}}{(1+\text{i})^{\text{n}}-1}]$

The FV syntax in excel is as follows: -PMT(rate, nper, pv, [fv], [type])

2.2.4. Return of Investment (ROI)

ROI, or Return on Investment, is a common metric used in project management to evaluate the financial success of a project. In software project management, ROI can be used to measure the financial benefits that a project will bring to the organization. We can calculate the ROI using the following formula:

ROI = (Financial Benefits - Project Costs) / Project Costs

A positive ROI indicates that the project will generate more financial benefits than its costs, while a negative ROI indicates that the project is not expected to be financially successful.

3. Scheduling

3.1. Activity Planning

A detailed plan for the project, must also include a schedule indicating the start and completion times for each activity.

3.1.1. Work Breakdown Structure

It uses Work Breakdown Structure (WBS) to generate a task list:

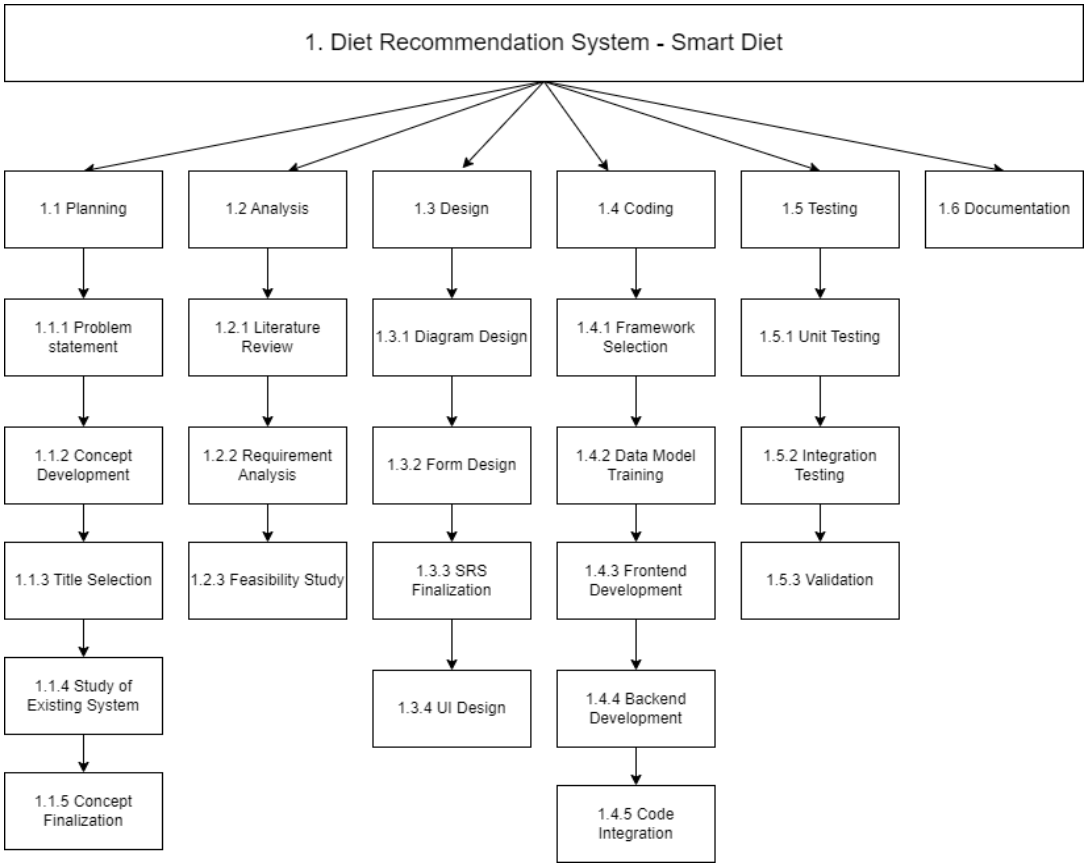


Figure 1 Work Breakdown Structure

3.1.2. Inserting Tasks

a. Open MS Project and create a new blank project.
b. From the view options, choose Gantt Chart option.
c. Add the tasks in the Task Name column of the sheet. You can either copy & paste the tasks from another list or click in the text field and type the name of each task.

3.1.3. Creating Task Hierarchy

After the tasks have been input in order, we can put hierarchy in the task using indentation. We can either indent a task or outdent a task using the icons in “Schedule” section of the Task menu bar. When we indent a task, it becomes the subtask of the task above it. The more a task is indented the more its hierarchy decreases.

3.1.4. Defining Duration, Start Date and End Date

Defining start date and finish date are similar processes with a.

- Click on the start or finish date, then enter the date manually or select one from the date picker.
- After, selecting the start and end date, the duration will be automatically calculated based on the work-time provided.
- An alternative way of entering start and finish is to enter one of them and enter the estimated duration required to complete the task and the corresponding date will be automatically updated.

After assigning start and finish date for all of the tasks, the Gantt chart will be created on the right-hand side as shown in the figure below.

3.1.5. Adding Predecessors

- Add predecessors to tasks, simply by adding the task number in the predecessor’s column.
- Task number of the predecessor task or tasks is typed into the predecessor column corresponding to the dependent task.
- This adds the simple finish-to-start dependency between the tasks. This linkage can also be seen in the Gantt chart

3.1.6. Task/ Activities and Gantt Chart

Gantt Chart is a graphic representation of project activities, shown in a time-scaled bar line with no links shown between activities.

The list of the tasks and the Gantt Chart is shown below as:

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
1		**Planning**	**22 days**	**Fri 12/2/22**	**Mon 1/2/23**	
2		Problem Statement	2 days	Fri 12/2/22	Mon 12/5/22	
3		Concept Development	4 days	Tue 12/6/22	Mon 12/12/22	2
4		Title Selection	4 days	Tue 12/13/22	Fri 12/16/22	
5		Study of existing system	10 days	Fri 12/16/22	Thu 12/29/22	
6		Concept Finalizatio	2 days	Fri 12/30/22	Mon 1/2/23	2,3,5
7		**Analysis**	**15 days**	**Mon 1/2/23**	**Fri 1/20/23**	
8		Study of literature Review	2 days	Mon 1/2/23	Tue 1/3/23	
9		Requirement Analy	10 days	Wed 1/4/23	Tue 1/17/23	6,8
10		Feasibility Study	3 days	Wed 1/18/23	Fri 1/20/23	9
11		**Design**	**20 days**	**Wed 1/18/23**	**Tue 2/14/23**	
12		Diagram Design	5 days	Wed 1/18/23	Tue 1/24/23	9
13		Form Design	3 days	Tue 1/31/23	Thu 2/2/23	
14		SRS Finalization & Review	4 days	Wed 1/25/23	Mon 1/30/23	12
15		UI Design	8 days	Fri 2/3/23	Tue 2/14/23	14
16		**Coding**	**40 days**	**Wed 2/15/23**	**Tue 4/11/23**	
17		Framework Selecti	3 days	Wed 2/15/23	Fri 2/17/23	15
18		Data Model Trainin	7 days	Mon 2/20/23	Tue 2/28/23	17
19		FrontEnd Coding	10 days	Wed 3/1/23	Tue 3/14/23	18
20		Backend Coding	10 days	Wed 3/15/23	Tue 3/28/23	19
21		Code Integration	10 days	Wed 3/29/23	Tue 4/11/23	20
22		**Testing**	**6 days**	**Wed 4/12/23**	**Wed 4/19/23**	
23		Unit Testing	3 days	Wed 4/12/23	Fri 4/14/23	21
24		Integration Testing	2 days	Mon 4/17/23	Tue 4/18/23	23
25		Validation	1 day	Wed 4/19/23	Wed 4/19/23	24
26		**Finalization**	**3 days**	**Thu 4/20/23**	**Mon 4/24/23**	
27		Final Documentatio	2 days	Thu 4/20/23	Fri 4/21/23	25
28		Review	1 day	Mon 4/24/23	Mon 4/24/23	27
29		**Documentation**	**102 days**	**Fri 12/2/22**	**Mon 4/24/23**	
30		Documentation	102 days	Fri 12/2/22	Mon 4/24/23	

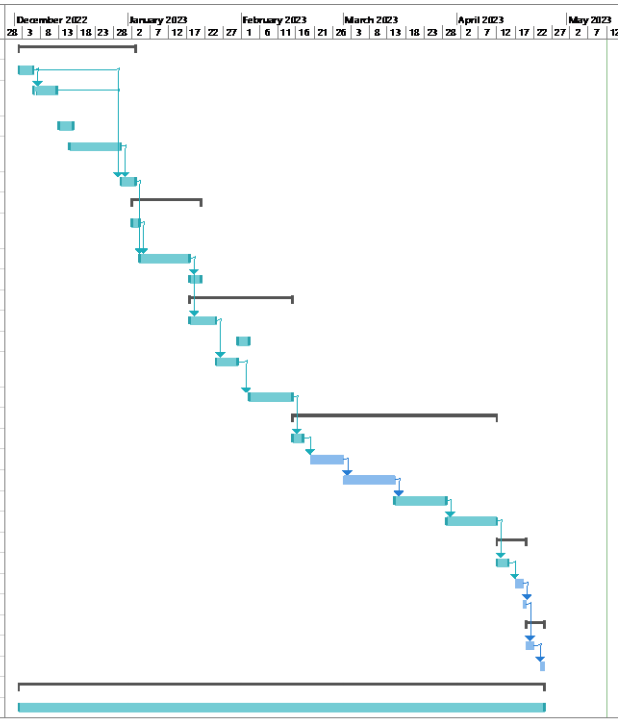


Figure 2 Activity and Gantt Chart

3.1.7. Defining and Adjusting Work Time

- Go to the Project tab on the menu bar.
- Click on Change Working Time.
- Dialog box named ‘Change Working Time,’ appears where we can manage, edit or adjust anything related to the work time of the project.

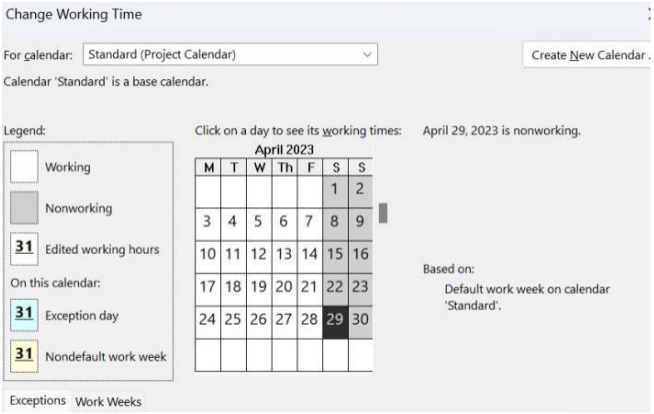


Figure 3 Defining and Adjusting working time

3.1.8. Creating a new calendar

- Click on Create New Calendar on the top right corner.
- A dialog box appears asking how we want to create the new calendar.

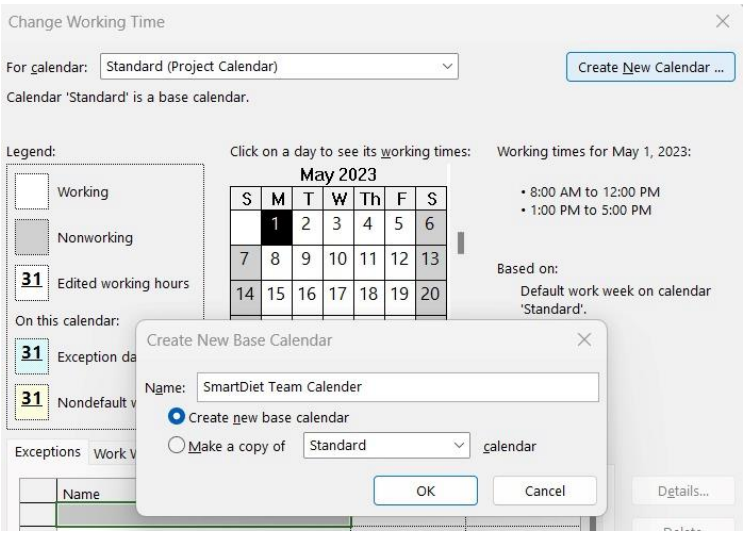


Figure 4 Creating new calendar

We can either create a completely new base calendar or create a copy of already available Standard, Night Shift, or 24 Hours calendar.

3.1.9. Adding exceptions and holidays to calendar

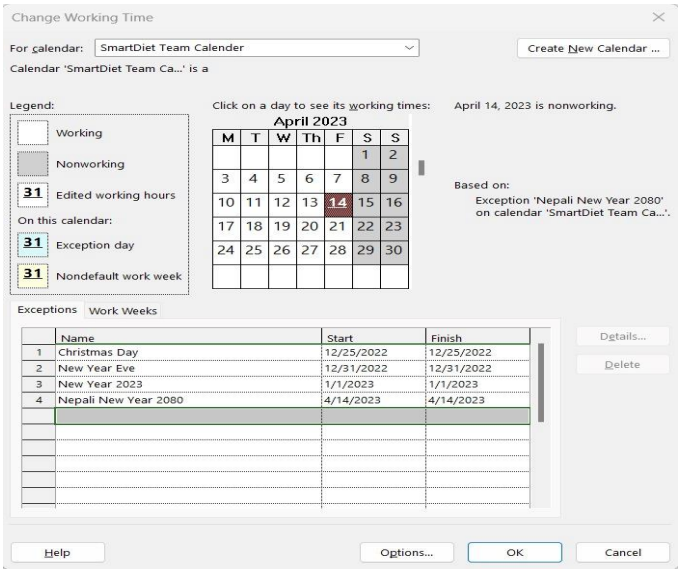


Figure 5 Adding exception and holidays to calendar

List down the exceptions in the exception sheet of Change Working Time dialog box giving the name of the exception along with its start date and finish day as shown in figure. We can also insert additional details to the exceptions such as half-day work, recurrence pattern or range of recurrence. Double-click on the exception's name or on the Details button present on the right side. Here we are assuming Saturday and Sunday as non-working days.

3.1.10. Changing Work Time Defaults

Certain schedule elements such as start of the day, work start time, work end time, hours per day, etc. are set at a default value. To change defaults, click on Options button at the bottom right for the Change Working Time dialog box.

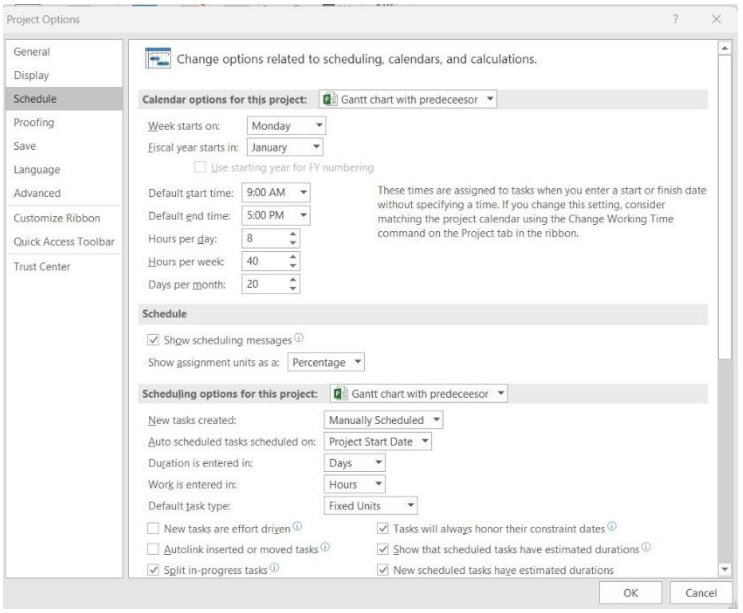


Figure 6 Changing work time

3.2. Network Planning

Network planning model is an approach to scheduling which achieve this separation between the logical and the physical. There are various common models to calculate and evaluate project critical activities and critical path. Such as Critical path method, Program Evaluation Review technique and Precedence Diagram method. Most commonly used technique is Critical Path Method (CPM).

3.2.1. Illustration of Critical Path with MS project

For this lab we are assuming the data from the task list whose snapshot of activities is shown in the given figure.

	Task Mode	Task Name	Duration	Start	Finish	Predecessors
1		Planning	22 days	Fri 12/2/22	Mon 1/2/23	
7		Analysis	15 days	Mon 1/2/23	Fri 1/20/23	1
11		Design	20 days	Wed 1/18/23	Tue 2/14/23	7
16		Coding	40 days	Wed 2/15/23	Tue 4/11/23	7,11
22		Testing	6 days	Wed 4/12/23	Wed 4/19/23	16
26		Finalization	3 days	Thu 4/20/23	Mon 4/24/23	22
29		Documentation	102 days	Fri 12/2/22	Mon 4/24/23	26

Figure 7 Task list for critical path

To find the critical path

• Click Task and choose Network Diagram Tools

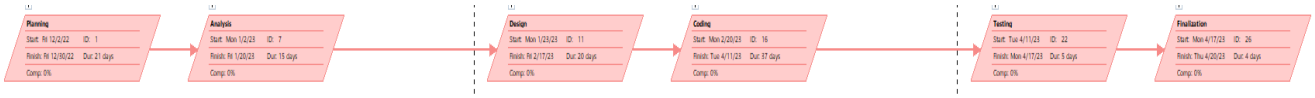


Figure 8 Critical path

4. Risk Analysis

4.1. Risk Exposure

Risk exposure is a measure of the potential impact that a risk event could have on a project or organization. It is calculated by multiplying the probability of the risk occurring by the impact that it would have if it did occur. There are several metrics that can be used to measure risk exposure, including:

- **Probability:** The likelihood of a risk event occurring. This can be measured on a scale of 0 to 1, with 0 indicating no chance of the risk event occurring and 1 indicating a certainty that the risk event will occur.
- **Impact:** The potential consequences of a risk event if it were to occur. This can be measured in terms of financial impact, time impact, or impact on project quality or performance.
- **Risk Exposure:** The potential impact of a risk event, calculated as the product of its probability and impact. This provides a quantitative measure of the risk's potential impact on the project or organization.
- **Risk Severity:** The seriousness of a risk event, based on its potential impact & the likelihood of it occurring. This can be measured on a scale of low, medium, or high.

By using these metrics, project managers can gain a better understanding of the potential impact of a risk event on their project or organization. Example:- Assume this software project has identified a risk event where there is a 30% chance that the project will experience a delay due to a shortage of resources. The impact of the delay is estimated to be a cost of $500 in additional resources and lost revenue.

To calculate the risk exposure, we would multiply the probability and impact as follows:

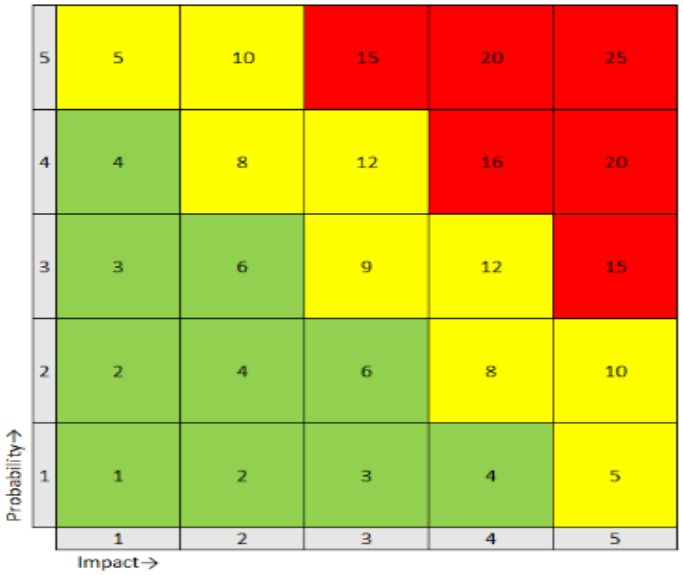
- Risk Exposure = Probability x Impact
- Risk Exposure = 30% x $500
- Risk Exposure = $150

This means that if the risk were to occur, it could cost the project or organization up to $150 in additional expenses or lost revenue.

By calculating risk exposure for different risk events, project managers can prioritize their risk mitigation efforts based on the risks that have the highest potential impact on the project or organization.

4.2. Illustration with MS Excel

We have identified 10 potential risks that could impact our system. The probability and impact scores are assigned on a scale of 1 to 5, with 1 being low and 5 being high. The risk exposure score is calculated by multiplying the probability and impact scores, while the priority score is assigned on a scale of 1 to 5, with 1 being low priority and 5 being high priority.



In this graph, the impacts are plotted on the x-axis, while the probability scores are plotted on the y-axis. The bars are color-coded based on the risk exposure scores, with red bars indicating high-priority risks, yellow bars indicating medium-priority risks, and green bars indicating low-priority risks.

From this graph, we can see that there are no highest-priority risks. R1, R2, R3, R5, R6, R7, R8, R9 are the highest-priority risks, which have the risk exposure scores of 12, 12, 10, 5, 8, 9, 9 and respectively. In contrast, R4 AND R10 are the lowest-priority risks, both with risk exposure scores of 6.

5. Resource Allocation

Effective resource allocation and scheduling are critical components of project management, as they ensure that tasks are completed on time and within budget. Resource allocation involves assigning the necessary resources, such as materials, employees, and equipment, to project activities based on their availability and the project timeline.

5.1. Resource Smoothing

Resource smoothing is a project management technique that aims to balance resource utilization throughout the project timeline, avoiding peaks and valleys of demand. This process involves analyzing the project schedule to identify periods of high resource demand or over-allocation of resources and adjusting the schedule by delaying non-critical activities or reassigning resources. It helps to optimize resource utilization, minimize delays, and prevent team members from being overburdened by an unmanageable workload.

5.2. Resource Leveling

Resource leveling is a project management technique that aims to balance the demand for resources with the available supply. This process involves analyzing the project schedule to identify periods of over- or under- allocation of resources and adjusting the schedule to align the demand for resources with the available supply. By leveling resources, project managers can reduce the risk of delays, overburdening team members, and exceeding the allocated budget.

5.3. Illustration in MS Project

To illustrate resource allocation in MS Project, you need to schedule tasks, schedule resources, and allocate resources to the tasks in the project plan while considering resource availability and project timeline. This ensures that the project is completed on time, within budget, and with the necessary resources.

5.3.1. Schedule Tasks

First open task sheet and insert task name, duration, start-date, end-date, predecessor.

5.3.2. Schedule Resources

Open Resource Sheet and insert and set Resource Name, Type, Material, Group, Max (Capacity), Standard Rate, Over-Time Rate, Cost per Use, and Base Calendar for the project. Initials will be generated and set automatically.

5.3.3. Allocate Resources to Activities

Go to Task Sheet and set Resource Column for the particular task. Resource column have list of all the resources as drop down.

6. Monitoring and Controlling

There are a range of monitoring and control techniques that can be used by project managers, including collecting data progress, Cost monitoring, and Earned value Analysis.

6.1. Earn Value Analysis

Earned Value Analysis (EVA) helps to track the progress of a project by measuring the actual value of the work completed against the planned value of the work scheduled to be completed at a given point in time. EVA calculates three key metrics. They are Planned Value (PV), Earned Value (EV), and Actual Cost (AC).

- **Planned Value (PV)** is the planned cost of the work that was scheduled to be completed up to a certain point in time in the project schedule. It is also called Budgeted Cost of Work Scheduled (BCWS).
- **Earned Value (EV)** is the value of the work that has been completed up to the same point in time. It is also called Budgeted Cost of Work Performed (BCWP).
- **Actual Cost (AC)** is the actual cost of the work that has been completed up to the same point in time. It is also called Actual Cost of Work Performed (ACWP).

Once these values are calculated, the following EVA metrics can be derived.

- **Schedule Variance (SV)** is the difference between the EV and PV, and it indicates whether the project is ahead of or behind schedule. SV = EV - PV.
- **Cost Variance (CV)** is the difference between the EV and AC, and it indicates whether the project is under or over budget. CV = EV - AC.
- **Schedule Performance Index (SPI)** is the ratio of EV to PV, and it indicates the efficiency of the project in terms of schedule. SPI = EV / PV.
- **Cost Performance Index (CPI)** is the ratio of EV to AC, and it indicates the efficiency of the project in terms of cost. CPI = EV / AC.

7. Testing

For testing the project, we will be going through the series of test cases to check the modules of our project. After the successful

7.1. Test Cases for Unit Testing

ID	Test Case	Expected Result	Actual Result
T1	Page loading	The home page should load correctly and in a reasonable amount of time.	Home Page Loaded successfully.
T2	Layout	The layout of the home page should be consistent and visually appealing.	Layout was consistent and visually appealing.
T3	Navigation	The navigation bar should be easy to understand and use. It should route to the correct pages.	Navigation Bar Worked properly.
T4	Links	All the links should be correct. They should route to intended correct destinations.	All links worked properly.
T5	Images	All the images used in the homepage should be displayed correctly.	All images were displayed.

7.2. Test Cases for System Testing

ID	Test Case	Expected Result	Actual Result
T6	Browser compatibility	The application should work in different browsers like Microsoft Edge, Google Chrome, Firefox, etc.	Worked successfully in Microsoft Edge, Google Chrome and Firefox.

T7	Calculate BMI	The application should calculate the BMI index using user's age, height, weight and activity level.	BMI Index was calculated successfully.
T8	Calculate Calorie	The application should calculate required calorie based on the BMI Index.	Calorie amount calculated successfully.
T9	Generate meals based on BMI	The application should generate meals recommendation on the basis of the BMI Index.	BMI based diet recommended successfully.
T10	Generate meals based on nutrition values	The application should generate meals recommendation on the basis of the amount of nutrition values provided by the user.	Nutrition Values based diet recommended successfully.
T11	Generate meals based on ingredients	The application should generate meals recommendation on the basis of the different ingredients the user wants in their meal.	Ingredients based diet recommended successfully.
T12	Generate meals for meal planning	The application should generate meals recommendation based on the basis the user plan their meal i.e., 3 meals or 4 meals or 5 meals per day.	Meals for the meal planning was generated successfully.
T13	Security	The application should ensure the security of user data.	The application is secure.

7.3. Result Analysis

The result of the testing of for project Smart Diet was analyzed and validated that it meets our objectives and requirements. Any errors found during the unit testing were debugged before conducting the integration and system testing. The results from the test case showed that the Smart Diet system is functioning as intended and is reliable and secure.

8. Version Control

Version control systems are a category of software tools that helps in recording changes made to files by keeping a track of modifications done in the code. The most popular example is Git, Helix core, Microsoft TFS.

8.1. Git

Among all version control system, we have chosen Git. Git is a distributed version control system. Git helps you keep track of code changes. Git is used to collaborate on code.

1. **Git configuration:**
   - **Git config**

     Get and set configuration variables that control all facets of how Git looks and operates.

     Set the name: $ git config --global user.name "User name"

     Set the email: $ git config --global user.email "design2079team@gmail.com"

     Check the setting**:** $ git config -list
   - **Git alias**

     Set up an alias for each command:

     $ git config --global alias.co checkout

     $ git config --global alias.br branch

     $ git config --global alias.ci commit

     $ git config --global alias.st status
2. **Starting a project**
   - **Git init**

     Create a local repository**:** $ git init
   - **Git clone**

     Make a local copy of the server repository: $ git clone
3. **Local changes**
   - **Git add**

     Add a file to staging (Index) area: $ git add Filename

     Add all files of a repo to staging (Index) area: $ git add*

- **Git commit**

  Record or snapshots the file permanently in the version history with a message**:** $ git commit -m " Commit Message"

4. **Track changes**
   - **Git diff**

     Track the changes that have not been staged: $ git diff

     Track the changes that have staged but not committed: $ git diff --staged

     Track the changes after committing a file: $ git diff HEAD

     Track the changes between two commits: $ git diff
   - **Git Diff Branches**: $ git diff < branch 2>
   - **Git status**

     Display the state of the working directory and the staging area: $ git status
   - **Git show Shows objects:** $ git show
5. **Commit History**
   - **Git log**

     Display the most recent commits and the status of the head: $ git log

     Display the output as one commit per line: $ git log -oneline

     Displays the files that have been modified: $ git log -stat

     Display the modified files with location: $ git log -p
6. **Ignoring files**
   - **.gitignore** - Specify intentionally untracked files that Git should ignore.

     Create .gitignore: $ touch .gitignore

     List the ignored files: $ git ls-files -i --exclude-standard
7. **Branching**
   - **Git branch**

     Create branch:$ git branch

     List Branch: $ git branch --list

     Delete a Branch: $ git branch -d

     Delete a remote Branch: $ git push origin -delete

     Rename Branch:$ git branch -m

- **Git checkout** - Switch between branches in a repository.

  Switch to a particular branch: $ git checkout

  Create a new branch and switch to it: $ git checkout -b

  Checkout a Remote branch: $ git checkout

8. Merging

- **Git merge**

  Merge the branches: $ git merge

  Merge the specified commit to currently active branch: $ git merge

- **Git rebase**

  Apply a sequence of commits from distinct branches into a final commit: $ git rebase

  Continue the rebasing process: $ git rebase -continue

  Abort the rebasing process:$ git rebase --skip

- **Git interactive rebase**

  Allow various operations like edit, rewrite, reorder, and more on existing commits: $ git rebase -i

9. Remote

- **Git remote**

  Check the configuration of the remote server: $ git remote -v

  Add a remote for the repository: $ git remote add

  Fetch the data from the remote server: $ git fetch

  Remove a remote connection from the repository: $ git remote rm

  Rename remote server: $ git remote rename

  Show additional information about a particular remote: $ git remote show

  Change remote: $ git remote set-url

- **Git origin master**

  Push data to the remote server: $ git push origin master

  Pull data from remote server: $ git pull origin master

10. Pushing Updates

- **Git push** - Transfer the commits from your local repository to a remote server.

  Push data to the remote server: $ git push origin master

Force push data: $ git push -f

Delete a remote branch by push command: $ git push origin -delete edited

11. Pulling updates

- **Git pull**

  Pull the data from the server: $ git pull origin master

  Pull a remote branch: $ git pull

- **Git fetch** - Download branches and tags from one or more repositories.

  Fetch the remote repository: $ git fetch< repository Url>

  Fetch a specific branch: $ git fetch

  Fetch all the branches simultaneously: $ git fetch -all

  Synchronize the local repository: $ git fetch origin

12. Undo changes

- **Git revert**

  Undo the changes: $ git revert

  Revert a particular commit: $ git revert

- **Git reset**- Reset the changes

  $ git reset -hard

  $ git reset -soft

  $ git reset --mixed

13. Removing files

- **Git rm**

  Remove the files from the working tree and from the index: $ git rm <file Name>

  Remove files from the Git But keep the files in your local repository: $ git rm –cached

9. Conclusion

In conclusion, the development of a diet recommendation system can be extremely beneficial for individuals seeking to improve their health and wellness through diet. By leveraging data on individual preferences, dietary restrictions, and health goals, the system can provide personalized meal plans and nutritional guidance to help users make informed choices about their diets. However, it is important to note that such a system should not replace the advice of a qualified healthcare professional, and users should always consult with a medical professional before making significant changes to their diets. Overall, a diet recommendation system has the potential to promote healthier eating habits and improve overall health outcomes for users.

10. Appendix

10.1. Creating a Project File

Open MS Project and create a new blank project.

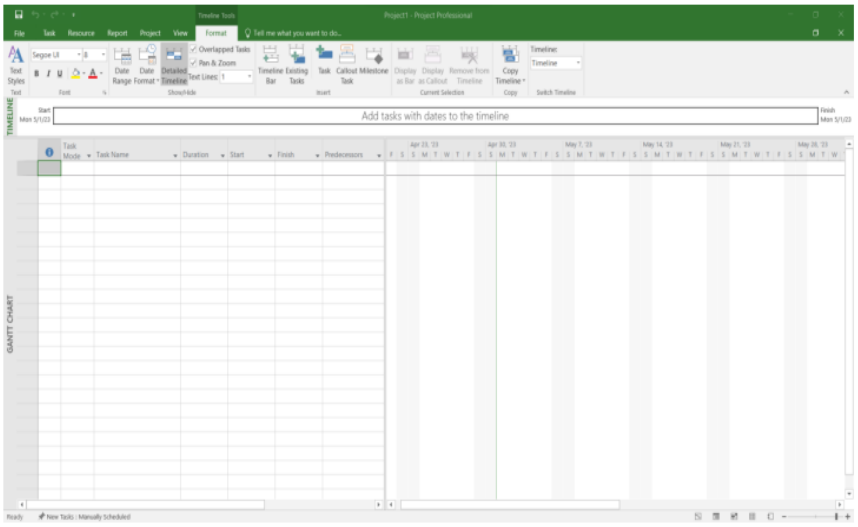


Figure 9 Creating a Project file

10.2. How to use Excel

10.2.1. Creating an Excel file

To create a excel, we first install and open the Ms. Excel then we land on the start page:

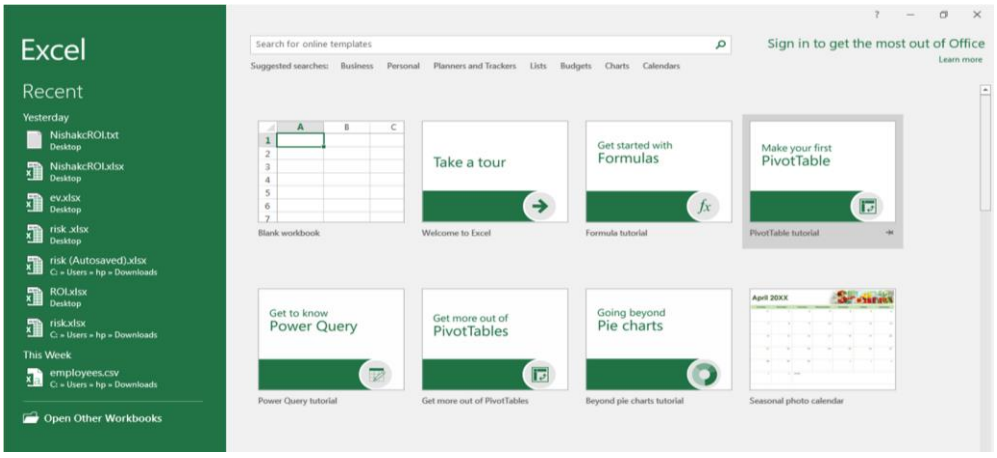


Figure 10 Creating Excel File

From this page, we can create and start an Excel as per our preference among the following options:

- Start a new *blank workbook*
- Start a new workbook *from existing file*
- Start a new file using *templates*
- Continue on the *recent* or *other* files.

If we start a new *blank workbook*, we get to the following screen:

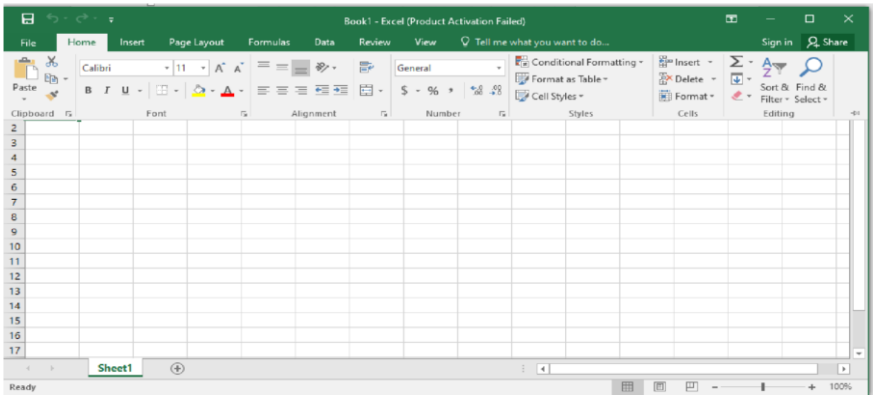


Figure 11 New blank Workbook

After we create an excel file, we see multiple interfaces in menu bar namely, Home, Insert, Page layout, Formula, Data, Review, View

10.2.2. Formula

Excel comes with lots of formulas including financial, logical, text, date & time, lookup & reference, and math & trigonometry

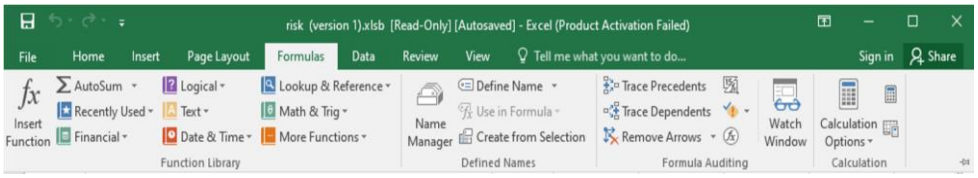


Figure 12 Formula Field in Excel

10.3. Illustration with Microsoft Excel for Present Worth

Suppose our project has been launched and introduced for the use. The initial outlay is $2000 and annual revenue respectively for 10 years is $400 assuming 20% interest rate then the present worth is calculated as follows:

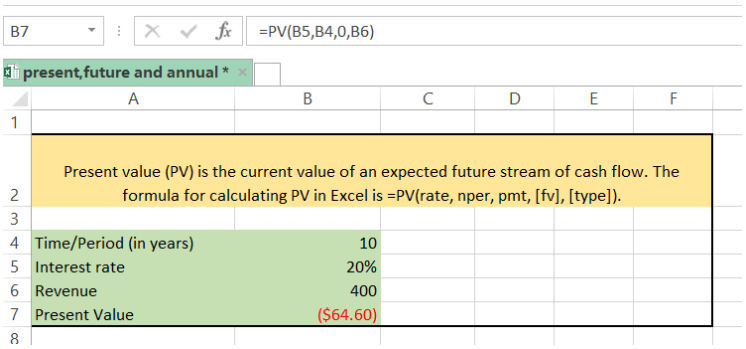


Figure 13 Present Worth

After calculating present worth providing rate, no. of period and the annual revenue, we got the present value as $64.60.

10.4. Illustration with Microsoft Excel for Future Worth

Suppose our project has been launched and introduced for the use. The initial outlay is $2000 and periodic payment respectively for 10 years is $1500 assuming 20% interest rate then the present worth is calculated as follows:

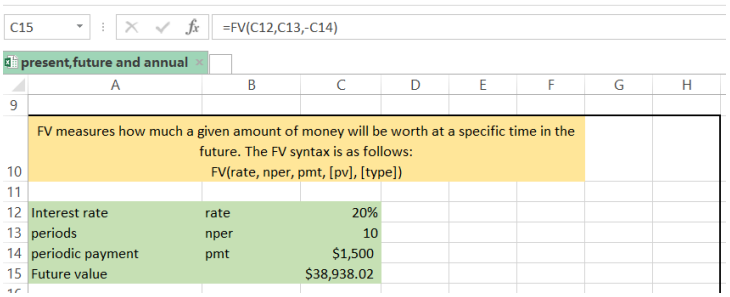


Figure 14 Future Worth when periodic payment is given

And for taking into account of Investment, we get the Future value as:

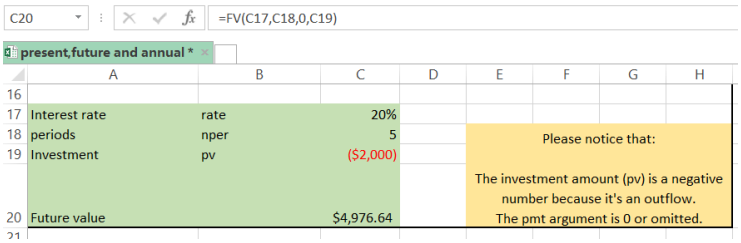


Figure 15 Future Worth when investment amount is given

10.5. Illustration with Microsoft Excel for Annual Worth

Suppose our project has been launched and introduced for the use. The initial outlay is $2000 and future value respectively for 10 years is $20,000 assuming 20% interest rate then the present worth is calculated as follows:

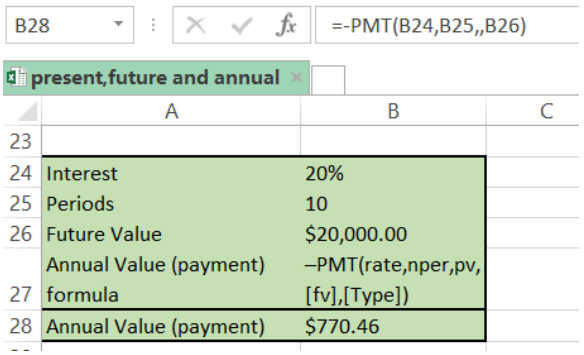


Figure 16 Annual Worth

10.6. Illustration with Microsoft Excel for ROI (Return on Investment)

Let's look at the illustration below where we calculate ROI for two projects A and B. As per formula of ROI, first find the summation of all cost (Net Profit Cost) by clicking on the cell where you wish to have the result then

- Click formulas menu
- Select Auto sum and select all the cell which we wish to add

Then find the ROI in the context of average annual year productivity. Click on the formula workspace and set the formula by starting with is equal to "=" signature. Then set formula as shown in figure below:-

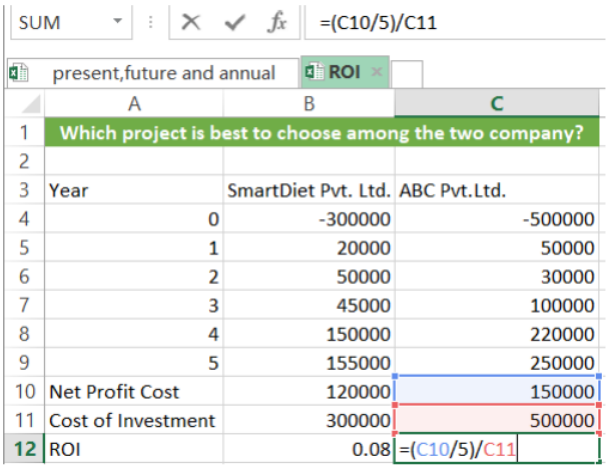


Figure 17 Setting Formula for calculating ROI

Result:

	A	B	C
1	Which project is best to choose among the two company?		
2			
3	Year	SmartDiet Pvt. Ltd.	ABC Pvt.Ltd.
4	0	-300000	-500000
5	1	20000	50000
6	2	50000	30000
7	3	45000	100000
8	4	150000	220000
9	5	155000	250000
10	Net Profit Cost	120000	150000
11	Cost of Investment	300000	500000
12	ROI	0.08	0.06

Figure 18 ROI

Interpretation: Project A from Smart Diet Pvt. Ltd. is expected to generate more financial benefits compared to its costs than Project B from ABC Pvt. Ltd. However, it is important to note that ROI should not be the only factor considered when making a decision. Other factors, such as the project's strategic alignment, resource availability, and risk assessment, should also be taken into account.

10.7. Illustration with Microsoft Excel for Earned Value Analysis

Example let's consider the following example: Assume that our project has a total budget of Rs. 5,00,000 and is expected to be completed in 100 days. At the 50th day, the project manager collects the following data:

- Planned Value (PV) or BCWS: Rs. 2,50,000
- Earned Value (EV) or BCWP: Rs. 2,00,000
- Actual Cost (AC) or ACWP: Rs. 3,00,000

Using the EVA formulas mentioned earlier, we calculate the following EVA metrics:

SV = EV - PV = 200000 - 250000 = -50,000. This means that the project is behind schedule by 50,000 at the end of the 50th day.

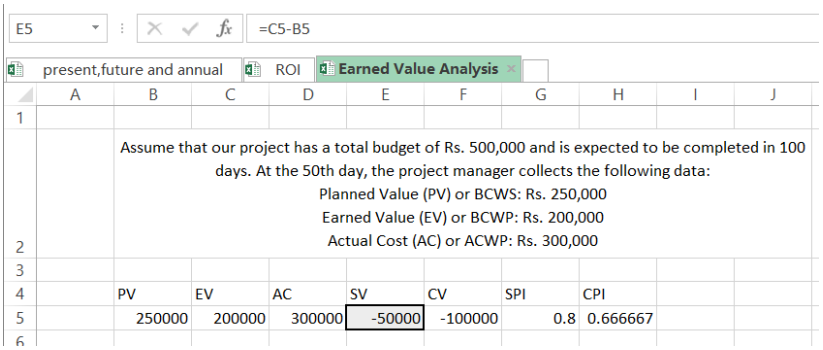


Figure 19 Calculation of SV

CV = EV - AC = 200000 - 300000 = -1,00,000. This means that the project is over budget by 1,00,000 at the end of the 50th day.

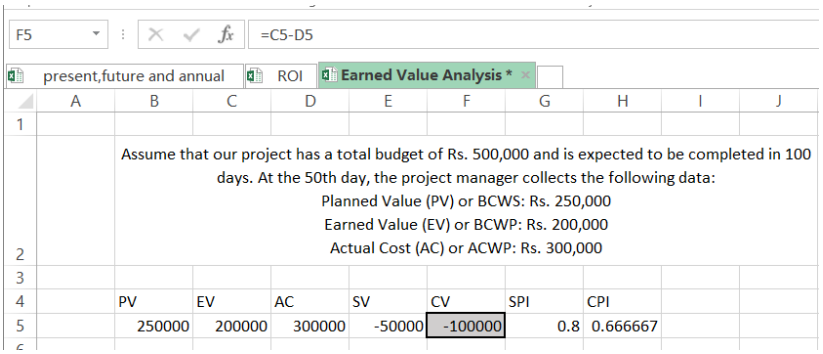


Figure 20 Calculation of CV

SPI = EV / PV =200000/250000 = 0.8. This means that the project is completing work at a rate of 0.8 of what was planned.

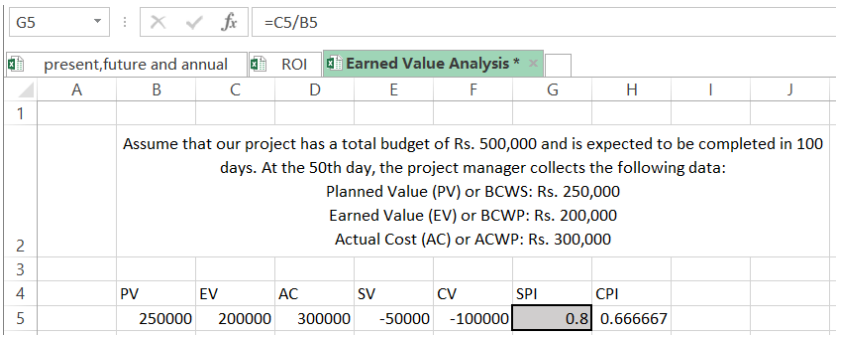


Figure 21 Calculation of SPI

CPI = EV / AC = 200000 /300000 = 0.67. This means that the project is spending Rs. 0.67 to earn Rs. 1 of the planned value.

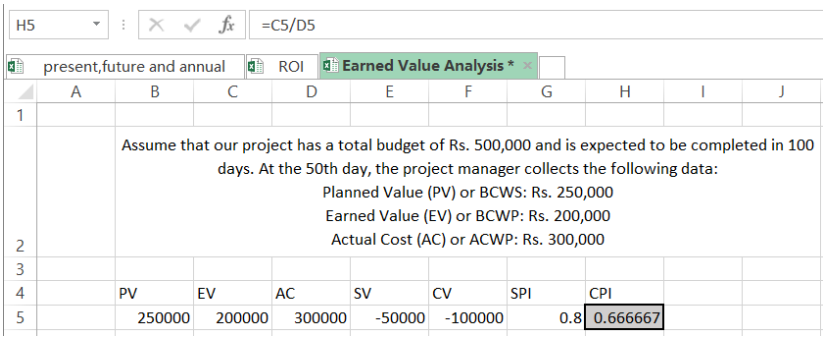


Figure 22 Calculation of CPI

Illustration on Excel Interpretation Based on the above EVA metrics, the project manager can identify that the project is behind schedule and over budget. They can take corrective actions to bring the project back on track, such as increasing the resources or re-sequencing the remaining work.

10.8. Illustration in MS Project for Resource Allocation

10.8.1. Scheduling task

Task Mode	Task Name	Duration	Start	Finish
	Planning	22 days	Fri 12/2/22	Mon 1/2/23
	Analysis	15 days	Mon 1/2/23	Fri 1/20/23
	Design	20 days	Wed 1/18/23	Tue 2/14/23
	Coding	40 days	Wed 2/15/23	Tue 4/11/23
	Testing	6 days	Wed 4/12/23	Wed 4/19/23
	Finalization	3 days	Thu 4/20/23	Mon 4/24/23
	Documentation	102 days	Fri 12/2/22	Mon 4/24/23

Figure 23 Scheduling task for resource allocation

10.8.2. Scheduling Resources

	Resource Name	Type	Material	Initials	Group	Max.	Std. Rate	Ovt. Rate	Cost/Use	Accrue	Base
1	Planning	Work		P		100%	$0.00/hr	$0.00/hr	$0.00	Prorated	SmartDiet Tear
2	Project Analysis	Work		P		100%	$0.00/hr	$0.00/hr	$0.00	Prorated	SmartDiet Tear
3	Designing	Work		D		100%	$0.00/hr	$0.00/hr	$0.00	Prorated	SmartDiet Tear
4	Data Model Training	Work		D		100%	$0.00/hr	$0.00/hr	$0.00	Prorated	SmartDiet Team Calender
5	Frontend Development	Work		F		100%	$0.00/hr	$0.00/hr	$0.00	Prorated	SmartDiet Team Calender
6	Backend Development	Work		B		100%	$0.00/hr	$0.00/hr	$0.00	Prorated	SmartDiet Team Calender
7	Testing	Work		T		100%	$0.00/hr	$0.00/hr	$0.00	Prorated	SmartDiet Tear
8	Documentation	Work		D		100%	$0.00/hr	$0.00/hr	$0.00	Prorated	SmartDiet Tear
9	Laptop	Material		L			$0.00		$0.00	Prorated	
10	Research Paper	Material		R			$0.00		$0.00	Prorated	
11	Books	Material		B			$0.00		$0.00	Prorated	
12	Team Member	Work		T		100%	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard

Figure 24 Scheduling Resources

10.8.3. Allocate Resources to Activities

	Task Mode	Task Name	Duration	Start	Finish	Predecess	Resource Names
1		Planning	22 days	Fri 12/2/22	Mon 1/2/23		Books[10],Laptop[3],Research Paper[20],Planning
7		Analysis	15 days	Mon 1/2/23	Fri 1/20/23		Books[10],Laptop[3],Research Paper[25],Project Analysis
11		Design	20 days	Wed 1/18/23	Tue 2/14/23		Designing,Laptop[3]
16		Coding	40 days	Wed 2/15/23	Tue 4/11/23		Backend Development,Data Model Training,Frontend Development,Laptop[3]
22		Testing	6 days	Wed 4/12/23	Wed 4/19/23		Laptop[3],Testing
26		Finalization	3 days	Thu 4/20/23	Mon 4/24/23		Laptop[3]
29		Documentation	102 days	Fri 12/2/22	Mon 4/24/23		Books[10],Documentation,Research Paper[25],Laptop[3]

Figure 25 Allocating resources to activities