

## Project 1

Project 1: Introduction to the course and the team.

10/10/2023  
10/10/2023  
10/10/2023

Project 1: Introduction to the course and the team. This project is designed to help you get familiar with the course and the team. It includes a series of tasks that will help you understand the course structure and the team's expectations. The tasks are as follows:

- 1. Read the course syllabus and understand the course structure.
- 2. Meet with your team members and discuss the course objectives.
- 3. Complete the introductory assignment.
- 4. Participate in the first lecture and discussion.
- 5. Submit your project report.

## Project 1

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## Technical Interview

1. **Reverse a linked list:** Write a function to reverse a linked list. Example: 1 → 2 → 3 → 4 → 5 becomes 5 → 4 → 3 → 2 → 1.

2. **Find the middle element:** Write a function to find the middle element of a linked list. Example: 1 → 2 → 3 → 4 → 5, middle is 3.

3. **Remove duplicates:** Write a function to remove duplicates from a linked list. Example: 1 → 2 → 3 → 2 → 1 becomes 1 → 2 → 3 → 1.

4. **Intersection of two linked lists:** Write a function to find the intersection point of two linked lists. Example: 1 → 2 → 3 → 4 → 5 and 6 → 7 → 8 → 9 → 4 → 5.

5. **Sort a linked list:** Write a function to sort a linked list. Example: 1 → 4 → 3 → 2 → 5 becomes 1 → 2 → 3 → 4 → 5.

6. **Palindrome check:** Write a function to check if a linked list is a palindrome. Example: 1 → 2 → 3 → 2 → 1 is a palindrome.

7. **Count nodes:** Write a function to count the number of nodes in a linked list. Example: 1 → 2 → 3 → 4 → 5 has 5 nodes.

8. **Sum of nodes:** Write a function to calculate the sum of all nodes in a linked list. Example: 1 → 2 → 3 → 4 → 5 has a sum of 15.

9. **Reverse a sub-list:** Write a function to reverse a sub-list of a linked list. Example: 1 → 2 → 3 → 4 → 5, reverse 2 → 3 to 3 → 2.

10. **Remove a node:** Write a function to remove a node from a linked list. Example: 1 → 2 → 3 → 4 → 5, remove 3 to get 1 → 2 → 4 → 5.

11. **Insert a node:** Write a function to insert a node into a linked list. Example: 1 → 2 → 3 → 4 → 5, insert 6 between 2 and 3 to get 1 → 2 → 6 → 3 → 4 → 5.

12. **Linked list to array:** Write a function to convert a linked list to an array. Example: 1 → 2 → 3 → 4 → 5 becomes [1, 2, 3, 4, 5].

13. **Array to linked list:** Write a function to convert an array to a linked list. Example: [1, 2, 3, 4, 5] becomes 1 → 2 → 3 → 4 → 5.

14. **Swap two nodes:** Write a function to swap two nodes in a linked list. Example: 1 → 2 → 3 → 4 → 5, swap 2 and 3 to get 1 → 3 → 2 → 4 → 5.

15. **Remove a node without head pointer:** Write a function to remove a node from a linked list without a head pointer. Example: 1 → 2 → 3 → 4 → 5, remove 3 to get 1 → 2 → 4 → 5.

16. **Reverse a linked list in groups:** Write a function to reverse a linked list in groups of size k. Example: 1 → 2 → 3 → 4 → 5, k=2 becomes 2 → 1 → 4 → 3 → 5.

17. **Sort a linked list using insertion sort:** Write a function to sort a linked list using insertion sort. Example: 1 → 4 → 3 → 2 → 5 becomes 1 → 2 → 3 → 4 → 5.

QUESTION 1

QUESTION	ANSWER	MARKS	STATUS	DATE	TIME	IP
1	1	1	1	1	1	1
2	2	2	2	2	2	2
3	3	3	3	3	3	3
4	4	4	4	4	4	4
5	5	5	5	5	5	5
6	6	6	6	6	6	6
7	7	7	7	7	7	7
8	8	8	8	8	8	8
9	9	9	9	9	9	9
10	10	10	10	10	10	10
11	11	11	11	11	11	11
12	12	12	12	12	12	12
13	13	13	13	13	13	13
14	14	14	14	14	14	14
15	15	15	15	15	15	15
16	16	16	16	16	16	16
17	17	17	17	17	17	17
18	18	18	18	18	18	18
19	19	19	19	19	19	19
20	20	20	20	20	20	20

QUESTION 2

QUESTION 3

QUESTION 4

QUESTION 5

QUESTION 6



No.	Name	Age	Sex	Religion	Remarks
1	...	...	...	...	...
2	...	...	...	...	...
3	...	...	...	...	...
4	...	...	...	...	...
5	...	...	...	...	...
6	...	...	...	...	...
7	...	...	...	...	...
8	...	...	...	...	...
9	...	...	...	...	...
10	...	...	...	...	...
11	...	...	...	...	...
12	...	...	...	...	...
13	...	...	...	...	...
14	...	...	...	...	...
15	...	...	...	...	...
16	...	...	...	...	...
17	...	...	...	...	...
18	...	...	...	...	...
19	...	...	...	...	...
20	...	...	...	...	...
21	...	...	...	...	...
22	...	...	...	...	...
23	...	...	...	...	...
24	...	...	...	...	...
25	...	...	...	...	...
26	...	...	...	...	...
27	...	...	...	...	...
28	...	...	...	...	...
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30	...	...	...	...	...
31	...	...	...	...	...
32	...	...	...	...	...
33	...	...	...	...	...
34	...	...	...	...	...
35	...	...	...	...	...
36	...	...	...	...	...
37	...	...	...	...	...
38	...	...	...	...	...
39	...	...	...	...	...
40	...	...	...	...	...
41	...	...	...	...	...
42	...	...	...	...	...
43	...	...	...	...	...
44	...	...	...	...	...
45	...	...	...	...	...
46	...	...	...	...	...
47	...	...	...	...	...
48	...	...	...	...	...
49	...	...	...	...	...
50	...	...	...	...	...
51	...	...	...	...	...
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81	...	...	...	...	...
82	...	...	...	...	...
83	...	...	...	...	...
84	...	...	...	...	...
85	...	...	...	...	...
86	...	...	...	...	...
87	...	...	...	...	...
88	...	...	...	...	...
89	...	...	...	...	...
90	...	...	...	...	...
91	...	...	...	...	...
92	...	...	...	...	...
93	...	...	...	...	...
94	...	...	...	...	...
95	...	...	...	...	...
96	...	...	...	...	...
97	...	...	...	...	...
98	...	...	...	...	...
99	...	...	...	...	...
100	...	...	...	...	...

Sales Performance Report - Q1 2024				
Region	Product Line	Units Sold	Revenue (\$)	Growth (%)
North America	Electronics	1200	\$150000	15%
North America	Software	800	\$180000	20%
North America	Services	500	\$100000	10%
Europe	Electronics	900	\$108000	12%
Europe	Software	600	\$120000	18%
Europe	Services	400	\$70000	8%
Asia	Electronics	1500	\$180000	25%
Asia	Software	1000	\$200000	30%
Asia	Services	700	\$140000	22%
Oceania	Electronics	300	\$36000	5%
Oceania	Software	200	\$40000	10%
Oceania	Services	100	\$15000	3%
Africa	Electronics	200	\$24000	4%
Africa	Software	150	\$30000	7%
Africa	Services	80	\$12000	2%
Total Global Sales				
Grand Total		10000	\$1500000	15%

QUESTION 1

1. The following information is available for the year ended 31/12/2018:

- Sales: 100,000
- Cost of sales: 60,000
- Selling expenses: 10,000
- Administrative expenses: 15,000
- Depreciation: 5,000
- Interest on bank loan: 2,000
- Dividend received: 1,000

2. The following information is available for the year ended 31/12/2018:

- Sales: 100,000
- Cost of sales: 60,000
- Selling expenses: 10,000
- Administrative expenses: 15,000
- Depreciation: 5,000
- Interest on bank loan: 2,000
- Dividend received: 1,000

QUESTION 2

1. The following information is available for the year ended 31/12/2018:

- Sales: 100,000
- Cost of sales: 60,000
- Selling expenses: 10,000
- Administrative expenses: 15,000
- Depreciation: 5,000
- Interest on bank loan: 2,000
- Dividend received: 1,000

Particulars	2018	2017	2016	2015	2014
Sales	100,000	100,000	100,000	100,000	100,000
Cost of sales	60,000	60,000	60,000	60,000	60,000
Selling expenses	10,000	10,000	10,000	10,000	10,000
Administrative expenses	15,000	15,000	15,000	15,000	15,000
Depreciation	5,000	5,000	5,000	5,000	5,000
Interest on bank loan	2,000	2,000	2,000	2,000	2,000
Dividend received	1,000	1,000	1,000	1,000	1,000

QUESTION 3

1. The following information is available for the year ended 31/12/2018:

Particulars	2018	2017	2016	2015	2014
Sales	100,000	100,000	100,000	100,000	100,000
Cost of sales	60,000	60,000	60,000	60,000	60,000
Selling expenses	10,000	10,000	10,000	10,000	10,000
Administrative expenses	15,000	15,000	15,000	15,000	15,000
Depreciation	5,000	5,000	5,000	5,000	5,000
Interest on bank loan	2,000	2,000	2,000	2,000	2,000
Dividend received	1,000	1,000	1,000	1,000	1,000





Time	Amplitude	Phase	Frequency	Period	Wavelength
0	0	0	1	1	1
1	1	0	1	1	1
2	0	0	1	1	1
3	-1	0	1	1	1
4	0	0	1	1	1
5	1	0	1	1	1
6	0	0	1	1	1
7	-1	0	1	1	1
8	0	0	1	1	1
9	1	0	1	1	1
10	0	0	1	1	1
11	-1	0	1	1	1
12	0	0	1	1	1
13	1	0	1	1	1
14	0	0	1	1	1
15	-1	0	1	1	1
16	0	0	1	1	1
17	1	0	1	1	1
18	0	0	1	1	1
19	-1	0	1	1	1
20	0	0	1	1	1

Figure 1: A graph showing a periodic signal with a period of 2 units and an amplitude of 1 unit.





Year	2008	2009	2010	2011	2012
Revenue	100	105	110	115	120
Operating Profit	20	22	24	26	28
Net Income	15	16	17	18	19
EPS	1.5	1.6	1.7	1.8	1.9

Year	2008	2009	2010	2011	2012
Revenue	100	105	110	115	120
Operating Profit	20	22	24	26	28
Net Income	15	16	17	18	19
EPS	1.5	1.6	1.7	1.8	1.9



**Revenue**

Revenue is the total amount of money received from the sale of goods or services. It is the primary source of funds for a company and is used to pay for the costs of production and distribution. Revenue is reported on the income statement and is a key indicator of a company's sales performance.

**Operating Profit**

Operating profit is the profit earned from the company's core operations. It is calculated by subtracting operating expenses from revenue. Operating profit is a measure of a company's profitability and is used to evaluate its operational efficiency.

**Net Income**

Net income is the profit earned after all expenses, including taxes and interest, have been deducted from revenue. It is the final profit earned by a company and is reported on the income statement. Net income is a key indicator of a company's overall financial performance.

**EPS**

EPS (Earnings Per Share) is a financial ratio that shows the amount of profit earned for each share of common stock. It is calculated by dividing net income by the number of shares outstanding. EPS is a key indicator of a company's profitability and is used to evaluate its performance relative to other companies in the industry.

**Operating Profit Margin**

Operating profit margin is a financial ratio that shows the percentage of revenue that is converted into operating profit. It is calculated by dividing operating profit by revenue. Operating profit margin is a measure of a company's operational efficiency and is used to evaluate its profitability relative to other companies in the industry.

**Net Income Margin**

Net income margin is a financial ratio that shows the percentage of revenue that is converted into net income. It is calculated by dividing net income by revenue. Net income margin is a measure of a company's overall profitability and is used to evaluate its performance relative to other companies in the industry.

**EPS Growth**

EPS growth is a financial ratio that shows the percentage change in earnings per share over a period of time. It is calculated by dividing the change in EPS by the starting EPS. EPS growth is a key indicator of a company's profitability and is used to evaluate its performance relative to other companies in the industry.

## 1. Introduction

The purpose of this document is to provide a comprehensive overview of the project's objectives, scope, and key findings. This report is intended for the project stakeholders and serves as a reference for future projects.

## 2. Project Objectives

The primary objectives of the project are to:

- Identify the key challenges and opportunities.
- Develop a strategic plan to address these challenges.
- Implement the plan and monitor progress.

## 3. Methodology

The project was conducted using a combination of qualitative and quantitative research methods. Data was collected through interviews, surveys, and analysis of existing documents. The findings were then synthesized to form a cohesive narrative.

## 4. Key Findings

The research identified several key findings that will inform the project's strategy. These include the importance of stakeholder engagement, the need for clear communication, and the value of data-driven decision-making.

## 5. Recommendations

Based on the findings, the following recommendations are made:

- Establish a strong project governance structure.
- Engage stakeholders early and often.
- Use data to track progress and adjust the plan as needed.

## 6. Conclusion

The project has provided valuable insights into the challenges and opportunities of the industry. The findings and recommendations will be used to guide the project's implementation and to inform future strategic planning.

## 7. Appendix

The appendix contains additional information related to the project, including a list of interviewees, a copy of the survey instrument, and a detailed analysis of the data. This information is provided for reference and to support the findings presented in the main report.

## 8. Summary

This summary provides a high-level overview of the project's key findings and recommendations. It is intended to provide a quick reference for stakeholders who are interested in the project's outcomes.

## 9. Acknowledgments

The author would like to thank the project team and stakeholders for their support and collaboration throughout the project. Their input and feedback were invaluable in shaping the project's direction and outcomes.

## 10. References

The following references were used in the preparation of this report:

- Project Charter
- Stakeholder Interview Notes
- Survey Results

Additional references are provided in the appendix for those interested in the project's methodology and findings.

## 11. Contact

For more information, please contact the project manager at [email address].

## 12. Glossary

The following terms are defined in this section:

Stakeholder: Any individual or organization that has an interest in the project.

Project Governance: The framework of rules, processes, and structures that guide the project.

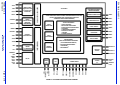
Data-Driven Decision-Making: The process of using data to inform strategic decisions.

Project Team: The group of individuals responsible for the project's execution.

The project team is composed of the following members:

- Project Manager
- Stakeholder Representative
- Subject Matter Expert

For more information, please contact the project manager at [email address].





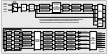


Figure 1: Schematic diagram of a multi-stage process flow.

## Introduction

This document provides a comprehensive overview of the project's goals, objectives, and scope. It outlines the key components and milestones, ensuring all stakeholders are aligned and informed.

### Background

The project is initiated in response to the current market conditions and the need for a strategic solution. The primary focus is on enhancing operational efficiency and customer satisfaction.

### Project Objectives

The main objectives of this project are to:

- Improve process efficiency by 20%.
- Reduce operational costs by 15%.
- Enhance customer satisfaction scores by 10%.

### Scope

The project scope includes the development, implementation, and testing of the proposed solution. It covers all relevant departments and processes within the organization.

### Key Deliverables

The key deliverables of the project are:

- Final project report.
- Implemented solution.
- Training materials for staff.

### Timeline

The project is scheduled to start on [Date] and is expected to be completed by [Date]. The timeline is subject to change based on project progress and resource availability.

### Resources

The project team consists of the following members:

- Project Manager: [Name]
- Team Lead: [Name]
- Team Members: [List of names]

### Risks

Key risks identified for this project include:

- Resource constraints.
- Scope creep.
- Communication gaps.

### Conclusion

The project is well-planned and has a clear path forward. We are confident in the team's ability to deliver a successful outcome that meets the organization's needs.

### Next Steps

The next steps in the project are to:

- Finalize the project plan.
- Begin implementation of the solution.
- Monitor progress and adjust as needed.

### Appendix

Additional information and supporting documents are provided in the appendix, including detailed timelines and resource allocation charts.

### References

Key references and sources used in the project include:

- [List of references]

### Disclaimer

This document is for informational purposes only and does not constitute a contract or any other legal agreement. All rights reserved.

### Contact Information

For more information, please contact the project manager at [Email Address] or [Phone Number].

## Project Overview

This section provides a high-level summary of the project's purpose and goals. It highlights the key areas of focus and the expected outcomes.

### Project Goals

The primary goals of the project are to:

- Identify and address key challenges.
- Develop a robust solution.
- Ensure successful implementation.

### Project Objectives

The project objectives are to:

- Complete the project within the budget.
- Meet all project milestones.
- Deliver a high-quality solution.

### Project Scope

The project scope is defined by the following parameters:

- Geographic location: [Location]
- Timeframe: [Start and End Dates]
- Resources: [List of resources]

### Key Milestones

The key milestones of the project are:

- Project Kick-off: [Date]
- Requirement Gathering: [Date]
- Design Phase: [Date]
- Implementation: [Date]
- Project Completion: [Date]

### Project Risks

Key risks identified for this project include:

- Resource availability.
- Scope creep.
- Communication issues.

### Project Budget

The project budget is estimated to be [Amount]. The budget is subject to change based on project progress and resource availability.

### Project Team

The project team consists of the following members:

- Project Manager: [Name]
- Team Lead: [Name]
- Team Members: [List of names]

### Project Schedule

The project is scheduled to start on [Date] and is expected to be completed by [Date]. The schedule is subject to change based on project progress and resource availability.

### Project Deliverables

The key deliverables of the project are:

- Final project report.
- Implemented solution.
- Training materials for staff.

### Project Conclusion

The project is well-planned and has a clear path forward. We are confident in the team's ability to deliver a successful outcome that meets the organization's needs.

### Next Steps

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### Appendix

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### References

Key references and sources used in the project include:

- [List of references]

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## QUESTION

1. The following table shows the results of a survey of 100 people. The table is divided into four quadrants based on gender and age group.

- Male, 18-30
- Male, 31-45
- Female, 18-30
- Female, 31-45

2. The following table shows the results of a survey of 100 people. The table is divided into four quadrants based on gender and age group.

3. The following table shows the results of a survey of 100 people. The table is divided into four quadrants based on gender and age group.

Age Group	Male	Female	Total
18-30	25	15	40
31-45	15	25	40
Total	40	40	80

- Male, 18-30
- Male, 31-45
- Female, 18-30
- Female, 31-45

Age Group	Male	Female	Total
18-30	25	15	40
31-45	15	25	40
Total	40	40	80

4. The following table shows the results of a survey of 100 people. The table is divided into four quadrants based on gender and age group.

5. The following table shows the results of a survey of 100 people. The table is divided into four quadrants based on gender and age group.

Overall Summary											
Category		Sub-Category		Item 1			Item 2		Item 3		
A	B	C	D	E	F	G	H	I	J		
				K	L	M	N	O	P	Q	R
				S	T	U	V	W	X	Y	Z
A	B	C	D	E	F	G	H	I	J		
				K	L	M	N	O	P	Q	R
				S	T	U	V	W	X	Y	Z
A	B	C	D	E	F	G	H	I	J		
				K	L	M	N	O	P	Q	R
				S	T	U	V	W	X	Y	Z
A	B	C	D	E	F	G	H	I	J		
				K	L	M	N	O	P	Q	R
				S	T	U	V	W	X	Y	Z



**Table 1: Summary of Data**

Year	Category	Value
2010	Category A	100
2010	Category B	200
2010	Category C	300
2010	Category D	400
2010	Category E	500
2010	Category F	600
2010	Category G	700
2010	Category H	800
2010	Category I	900
2010	Category J	1000
2011	Category A	110
2011	Category B	220
2011	Category C	330
2011	Category D	440
2011	Category E	550
2011	Category F	660
2011	Category G	770
2011	Category H	880
2011	Category I	990
2011	Category J	1100
2012	Category A	120
2012	Category B	240
2012	Category C	360
2012	Category D	480
2012	Category E	600
2012	Category F	720
2012	Category G	840
2012	Category H	960
2012	Category I	1080
2012	Category J	1200

**Table 2: Detailed Data**

Year	Category	Value
2010	Category A	100
2010	Category B	200
2010	Category C	300
2010	Category D	400
2010	Category E	500
2010	Category F	600
2010	Category G	700
2010	Category H	800
2010	Category I	900
2010	Category J	1000
2011	Category A	110
2011	Category B	220
2011	Category C	330
2011	Category D	440
2011	Category E	550
2011	Category F	660
2011	Category G	770
2011	Category H	880
2011	Category I	990
2011	Category J	1100
2012	Category A	120
2012	Category B	240
2012	Category C	360
2012	Category D	480
2012	Category E	600
2012	Category F	720
2012	Category G	840
2012	Category H	960
2012	Category I	1080
2012	Category J	1200

## Chapter 10: Mechanical Systems

10.1.1

10.1.2

10.1.3



- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_
- 6. \_\_\_\_\_
- 7. \_\_\_\_\_
- 8. \_\_\_\_\_
- 9. \_\_\_\_\_
- 10. \_\_\_\_\_

**QUESTION**

- 1. The following information relates to the operations of a company for the year ended 31st December 2018:
- 2. Sales revenue 1,000,000
- 3. Cost of sales (600,000)
- 4. Selling expenses (50,000)
- 5. Administrative expenses (100,000)
- 6. Depreciation (20,000)
- 7. Interest on bank overdraft (10,000)
- 8. Dividend received (10,000)
- 9. Profit before tax (110,000)
- 10. Tax on profit (22,000)
- 11. Profit after tax (88,000)
- 12. Dividend paid (10,000)
- 13. Retained profit (78,000)
- 14. Retained profit at the beginning of the year (100,000)
- 15. Retained profit at the end of the year (178,000)

Required:

**1. Prepare the Statement of Profit or Loss for the year ended 31st December 2018.**

Statement of Profit or Loss for the year ended 31st December 2018

Sales revenue	1,000,000
Cost of sales	(600,000)
Gross profit	400,000
Selling expenses	(50,000)
Administrative expenses	(100,000)
Depreciation	(20,000)
Interest on bank overdraft	(10,000)
Dividend received	10,000
Profit before tax	110,000
Tax on profit	(22,000)
Profit after tax	88,000
Dividend paid	(10,000)
Retained profit	78,000
Retained profit at the beginning of the year	100,000
Retained profit at the end of the year	178,000

**2. Prepare the Statement of Financial Position as at 31st December 2018.**

Statement of Financial Position as at 31st December 2018

Retained profit at the beginning of the year	100,000
Profit after tax	88,000
Dividend paid	(10,000)
Retained profit at the end of the year	178,000