



# UNIVERSITI TEKNOLOGI MALAYSIA

## SOFTWARE ENGINEERING PROGRAM

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# RESEARCH AND METHODOLOGY

## SECJ3032

### INTRODUCTION - PROJECT

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# TOPIC COVER

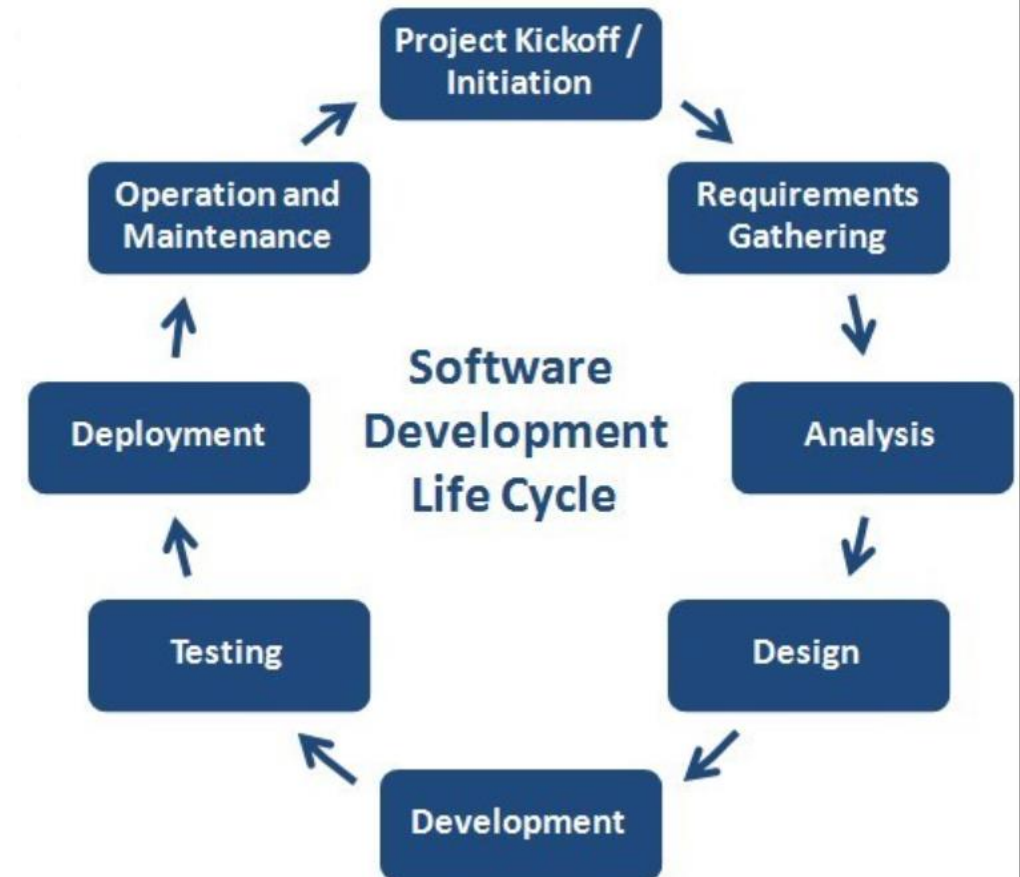
1. What is SYSTEM DEVELOPMENT - PROJECT?
2. The Different Between Research and Development
3. Research Process Cycle vs System Development Life Cycle
4. Key Characteristics of Project
5. Writing Proposal

# What is PROJECT REPORT – SYSTEM DEVELOPMENT

“No matter how good the team or how efficient the methodology, if we’re not solving the right problem, the project fails.” – Woody Williams

Projects are temporary, unique, goal-oriented activities that require specific resources to achieve a specific objective,

# Research Process Cycle VS System Development Life Cycle





# Characteristics of Project

1. A project is typically for a customer.
2. The project is temporary in nature. It typically has a defined start and a defined end-point.
3. The project will have a unique set of requirements that need to be delivered within the boundaries of this project.
4. A project can typically be more of a once-off endeavor, rather than something that's happening all the time in a repeated fashion.
5. A project is not 'business as usual', which is more akin to a process.
6. A project can very often be cross-functional, or indeed cross-organization.

# Characteristics of Project

1. **Temporary** : A project is a temporary endeavor with a defined start and end date
2. **Unique** : Projects are unique, with a specific goal or objective
3. **Scope** : Projects have a specific scope that defines what is included and excluded from the project.
4. **Resources** : Projects require specific resources to achieve their objectives, such as people, time, and budget.
5. **Risk** : Projects are often associated with risk, as they involve a degree of uncertainty and may encounter unexpected challenges.

# Why understanding project characteristics is important?

1. **It helps to identify project objectives.** By identifying the objectives they want to achieve, they can help define the project scope and determine the necessary resources.
2. **Determines project complexity:** To determine the level of complexity involved, which can help in planning and allocating resources accordingly.
3. **Enables better risk management:** It can identify potential risks and plan for them in advance, which can help in reducing the impact of any potential issues.
4. **Determines the project team:** It can also help in determining the skills and expertise required to successfully execute the project, which can help in selecting the right team members.
5. **Helps in selecting the right project management approach:** Different projects require different project management approaches, and understanding the characteristics of a project can help in selecting the most appropriate approach.



# Project Constraints

1. **Scope** – defines the needs that the customer has, or the requirements expressed and implied.
2. **Time** – a project is usually required by a customer by an agreed date.
3. **Quality** – to what standard is the project expected to deliver?
4. **Resources** – the amount of money, budget, or resources that are available to be expended on the project.

# System Development Writing Process STEP

After completing these steps, the researcher must prepare a report detailing his findings.

- ① Introduction
- ② Literature Review
- ③ Research Design - Methodology
- ④ Result and Analysis
- ⑤ Conclusion

**BASIC WRITING**



## INTRODUCTION CHAPTER FOR RESEARCH

- 1.1 Introduction
- 1.2 Problem Background
- 1.3 Research Aim
- 1.4 Research Question
- 1.5 Research Objectives
- 1.6 Research Scope
- 1.7 Research Contribution
- 1.8 Report Organization



## INTRODUCTION CHAPTER FOR SYSTEM DEVELOPMENT

- 1.1 Introduction
- 1.2 Problem Background
- 1.3 Project Aim
- 1.4 Project Objectives
- 1.5 Project Scope
- 1.6 Project Importance
- 1.7 Report Organization

# 1.1 Introduction

- 2 – 4 Paragraph
- What to write?
  - ✓ A humble introduction to the general area of the problem, pointing out its relevance, and scope for interesting work.

Exp:

Information processing is a very vital activity of any organization. Readily available information in a more user-analyzable format is the key to a successful organization, as it helps immensely in major decision-making processes. To achieve this goal data management and faster computing capability for data analysis is needed. Computer based information systems are playing a key role in this regard.

# 1.1 Introduction

Cont:

# The work being described here is related to **information processing of the land acquisition process** of XYZ Corporation.

1. Write one paragraph about what one means by the land acquisition process and why land acquisition is done.
2. Who all are involved, and state why the current process needs to be computerized?
3. One paragraph about how you got to take up this project and what you have accomplished within this exercise.

## 1.2 Problem Background

- ✓ You will basically attempt to develop a solution to some problem.
- ✓ start with a brief description of that problem,
- ✓ how things are done with the problem existing,
- ✓ drawbacks in that approach,



## 1.2 Problem Background

Exp:

### 1. Talk about the Organization

The Land Department is one of the several departments under XYZ Corp that is responsible for acquiring and subsequently, releasing any land area that has been found to have the possible potential of yielding ore. The complete process of acquiring of land till its release for extraction of ore to the concerned department is very critical and time bound, because it involves large sums of money.

### 2. Briefly stated, the process involved in the current system

The land acquisition involves the geological department which identifies the land to be acquired, the Civil department which conducts the survey of the land and makes various estimates, and the land department which interacts with the public administration authorities and the owners/occupiers of the land to be acquired.

### 3. Drawbacks of the existing system

The present system is completely manual, and hence, it has the usual drawbacks of a manual system, such as inconvenient operation, poor security, and poor efficiency.

# 1.2 Problem Background

Exp:

## 4. Motivation of the Project

- Explain the reason behind why the need to develop the new system.

## 5. List all the problem statements.

- Contextualize the problem. What do we already know?  
focus on the concrete details of the situation:
  - Where and when does the problem arise?
  - Who does the problem affect?
  - What attempts have been made to solve the problem?
- Describe the exact issue your research will address. What do we still need to know?
  - directly relevant to a specific problem that affects an organization, institution, social group, or society more broadly
    - What will happen if the problem is not solved?
    - Who will feel the consequences?
    - Does the problem have wider relevance? Are similar issues found in other contexts?

## 1.3 Project Aims

**Your research aims are the answer to the question, ‘What are you doing?’**

1. You need to clearly describe what your intentions are and what you hope to achieve. These are your aims.
2. Your aims may be to test theory in a new empirical setting, derive new theory entirely, construct a new data-set, replicate an existing study, question existing orthodoxy, and so on. Whatever they are, clearly articulate them and do so early. Definitely include them in your introduction and, if you’re smart, you’ll write them in your abstract.
3. Be very explicit. In the opening paragraphs, say, in simple terms, ‘the aim of this thesis is to...’
4. Think of your aims then as a statement of intent. They are a promise to the reader that you are going to do something. You use the next two hundred pages or so to follow through on that promise. If you don’t make the promise, the reader won’t understand your follow-through. Simple as that.

## 1.3 Project Aim

- ✓ The project aims is to overcome the drawbacks of the existing manual system or answering the problem statement.

Exp:

- Increase efficiency and convenience by computerizing the processing and transfer of information.
- Increase efficiency and reliability by suitable electronic medium for data storage.
- Increase information security by using suitable security model for information storage and processing.
- Increase the effectiveness by providing efficient and convenient information retrieval methods and by providing value-added information output.

## 1.3 Project Aims

### WHAT YOU SHOULD OR SHOULD NOT WRITE?

1. Avoid listing too many - two or three.
2. When you write them up, be very specific. Don't leave things so vague that the reader is left unsure or unclear on what you aim to achieve.
3. Make sure there is a logical flow between each of your aims. They should make sense together and should each be separate components which, when added together, are bigger than the sum of their parts.

Because they serve as the study's starting point, there needs to be a flow from your aims through your objectives to your project and contribution and then into the study itself.

If you have completed your project and found that you answered a different question (not that uncommon), make sure your original aims are still valid. If they aren't, refine them.

## 1.4 Project Objective

**The objectives are the answer to the question, ‘How are you doing it?’**

Project objectives refer to the steps you will take to achieve your aims.

When you write them, make sure they are SMART.

- **Specific:** talk in a precise and clear way about what you are going to do.
- **Measurable:** how will you know when you have achieved your aim?
- **Achievable:** make sure that you aren’t overly ambitious.
- **Realistic:** recognize the time and resource constraints of doing and don’t attempt to do too much.
- **Time constraints:** determine when each objective needs to be completed.



# 1.4 Project Objective

## Setting SMART goals

BiteSize Learning



### Specific

The goal is concrete and tangible - everyone knows what it looks like.



### Measurable

The goal has an objective measure of success that everyone can understand.



### Attainable

The goal is challenging, but should be achievable with the resources available.



### Relevant

The goal meaningfully contributes to larger objectives like the overall mission.



### Timely

This goal has a deadline or, better yet, a timeline of progress milestones.

# 1.4 Project Objective

## HOW TO WRITE?

1. Start each objective with an action verb
  - ✓ Use verbs when you list them
  - ✓ This makes your proposal look actionable and dynamic
2. Start each objective clearly and concisely
  - ✓ Use clear, simple and actionable language that can follow and understand the goal.
3. Use specific language to convey what you want to achieve
  - ✓ Don't need to packed with specific data
  - ✓ Should enough detail to show what you're studying
  - ✓ Must be clear – don't have any uncertainties about what you're doing
4. State your objective as outcomes rather than a process
  - ✓ Describe the objective as definitive answer rather than questions

# 1.4 Project Objective

<b>Understanding</b> (Understanding and organising information)	<b>Applying</b> (Solving problems using information)	<b>Analysing</b> (reaching conclusion from evidence)	<b>Synthesising</b> (Breaking down into components)	<b>Evaluating</b> (Judging merit)
Review Identify Explore Discover Discuss Summarise Describe	Interpret Apply Demonstrate Establish Determine Estimate Calculate Relate	Analyse Compare Inspect Examine Verify Select Test Arrange	Propose Design Formulate Collect Construct Prepare Undertake Assemble	Appraise Evaluate Compare Assess Recommend Conclude Select

# 1.4 Project Objective

## LIST OF VERB THAT CAN BE USE

Purpose	Verbs
To show analysis	analyse, appraise, define, diagnose, explore, identify, investigate, observe
To summarize	assess, conclude, feature, highlight
To indicate control (to be stable or to maintain at a level)	constrain, control, govern, influence, inhibit, limit, maintain, prohibit, regulate, secure
To discuss findings	attest, confirm, contend, demonstrate, document, indicate, reveal
To state	comment, convey, elaborate, establish, identify, propose
To show increase	advance, development, enlarge, exceed, extend, facilitate, improve, increment, maximize
To show decrease	alleviate, cease, decline, depress, descent, deteriorate, minimize, subside, reduce

# 1.4 Project Objective

## LIST OF VERB THAT CAN BE USE

To show change	alter, accommodate, difference, evolve, fluctuate, generate, transform, transition, vary
To indicate information in a figure	depict, display, illustrate, portray, reveal
To indicate information in a table	classify, enumerate, gives, lists, presents, summarizes
To stress that a task has been performed in-depth	adequately, comprehensively, exhaustively, extensively, thoroughly
To show parts	comprises, compose of, constitutes, encompasses, includes, incorporates
To indicate negative stand	challenge, contradict, disagree, dispute, reject, question
To indicate positive stand	confirm, compliment, corroborate, substantiate, support, uphold, validate, verify
To show approximation	approximate, estimate, resemble, predict

# Aims and Objective

## EXAMPLE 1:

### Aim:

To understand the contribution that local governments make to national level energy policy.

### Objectives:

1. To Conduct a survey of local politicians to solicit responses.
2. To Conduct desk-research of local government websites to create a database of local energy policy.
3. To Interview national level politicians to understand the impact these local policies have had.



## 1.4 Objective

### **Project Objective:**

1. To apply the Agile methodology in the system development phase.

### **Checking Against Recommended Approach:**

#### **Q: Is it specific?**

A: Yes, it is clear what the student intends to do (apply the Agile Methodology)

#### **Q: Is it measurable?**

A: Yes, it is measurable when Agile is successfully applied and the development phase is completed.

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#### **Q: Is it achievable?**

A: Yes, the objective can be achieved if the step in the Agile Methodology is successfully applied in the development phase.

## 1.4 Objective

CONT:

**Q: Is it relevant?**

A: Yes, because Agile methodology has been used in many development projects.

**Q: Is it timebound?**

A: Yes, it is possible to create a limited scope by applying the Agile methodology in a relatively short time, especially if you already have experience in methodology.

**Q: Does it start with a verb?**

A: Yes, it starts with '**apply**,' which immediately makes the objective's intent clear.

**Q: Is it a numbered list?**

A: Yes, it uses a numbered list for all the objectives that need to be achieved.

# Scope, Limitation and Delimitation

- Scope refers to the range of the project and the study limitations set in place to define the boundaries of the project, and delimitation refers to the specific aspects of the project that the study will focus on
- In simpler words, scope is the breadth of your study, while delimitation is the depth of your study.
- Scope and delimitation are both essential components of a research project, but they are often confused.
- The scope defines the study's parameters, while delimitation sets the boundaries within those parameters.
- The scope and delimitation of a study are usually established early on in the research process and guide the rest of the project.

# Scope, Limitation, and Delimitation

## **Significance of Scope and Delimitation**

Setting limits and focusing your study through scope and delimitation is crucial for the following reasons:

It allows the project's boundaries to be defined, enabling the team to focus on specific aspects of the project. This focus makes it easier to gather relevant data and avoid unnecessary information that might complicate the study's results.

Setting limits and focusing your study through scope and delimitation enables the developer to stay within the parameters of the project's resources.

A well-defined scope and delimitation ensure that the project can be completed within the available resources, such as time and budget, while still achieving the project's objectives.

# 1.6 Report Organization

## EXAMPLE

The breakdown of this thesis by chapters is;

**CHAPTER 1:** This chapter highlights the project and organization; the problem statement of the project is outlined together with the rationale and objectives with limitations are explained.

**CHAPTER 2:** This chapter mostly discusses past works around similar projects.

**CHAPTER 3:** In this chapter, introduce the methodology used, software, design.

**CHAPTER 4:** This chapter will discuss the analysis ....

# 1.6 Report Organization

## EXAMPLE

**CHAPTER 5:** In this chapter the result ....

**CHAPTER 6:** This is the conclusive chapter of this thesis. It summarizes and concludes all the findings from this thesis and outlines ideas for future works.



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