CHAPTER 3: METHODOLOGY
CHAPTER 4: RESULT AND DISCUSSION
METHODOLOGY

Problem Statements → Methodology → Solution
METHODOLOGY

• The methods section describes the rationale for the application of specific procedures or techniques used to identify, select, and analyze information applied to understanding the research problem, thereby, allowing the reader to critically evaluate a study’s overall validity and reliability. The methodology section of a research paper answers two main questions: How was the data collected or generated? And, how was it analyzed? The writing should be direct and precise and always written in the past tense.
METHODOLOGY

• Readers need to know how the data/result was obtained because the method you chose affects the findings and, by extension, how you likely interpreted them.

• There are a variety of different methods you can choose to investigate a research problem. The methodology section of your paper should clearly explain the reasons why you chose a particular procedure or technique.

• The methodology should discuss the problems that were anticipated and the steps you took to prevent them from occurring.

• It is important to always provide sufficient information to allow reader to adopt or replicate your methodology.
CONTENT OUTLINE

• Chapter 3: Methodology
  • Block Diagram
  • Flowchart
  • Schematic Diagram
  • Simulation Software
  • Plan layout
  • List of components/equipment
  • Cost Estimation
  • Gant chart
BASIC BLOCK DIAGRAM

INPUT

PROCESS

OUTPUT

- Power Supply
- Transmitter
- Antenna
- Receiver
- Signal Processor
- Environmental Control Unit
- Power Supply
BLOCK DIAGRAM

Input Circuit

CPU

Flash Memory

GPS

GPRS

LCD

Voice Alarm

Braking controller

AC 220V/380V

Trolley Horizontal Displacement Sensor

Trolley Vertical Displacement Sensor

Tilt Sensor

Wind Speed Sensor

Load Sensor
Flowchart of a One Second Response to a Switch

1. Start
2. Is Switch On?
   - Yes: Turn LED On
   - No: Has 1 second expired?
     - No: Print "Above Freezing"
     - Yes: Print "Below Freezing"
3. Temp < 32?
   - Yes: Print "Below Freezing"
   - No: Print "Above Freezing"
4. End
<table>
<thead>
<tr>
<th>Symbol</th>
<th>Purpose</th>
<th>Description</th>
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<tbody>
<tr>
<td>→</td>
<td>Flow line</td>
<td>Used to indicate the flow of logic by connecting symbols.</td>
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<td>◐</td>
<td>Terminal (Stop/Start)</td>
<td>Used to represent start and end of flowchart.</td>
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<td>□</td>
<td>Input/Output</td>
<td>Used for input and output operation.</td>
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<td>□</td>
<td>Processing</td>
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<td>Used to represent the operation in which there are two alternatives, true and false.</td>
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<td>On-page Connector</td>
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<td>Used to join different flowline.</td>
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<td>Used to connect flowchart portion on different page.</td>
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<td>Predefined Process/Function</td>
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<td>Used to represent a group of statements performing one processing task.</td>
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Circuit diagram of the 6X2 Super-heterodyne. Unless indicated otherwise, decimal capacitances are in μF, other capacitances in μμF, and resistors are 1/2 watt.
LAYOUT PLAN/HARDWARE DESIGN

Costume Hacking:
Hoodie Demo Project

Patriot Switch/Trans
SIMULATION SOFTWARE

```
const int buttonPin = 2;  // input pin for pushbutton
int previousButtonState = HIGH;  // for checking the state of a pushButton
int counter = 0;  // button push counter

void setup() {
  // make the pushButton pin an input:
  pinMode(buttonPin, INPUT);
  // initialize control over the keyboard:
  Keyboard.begin();
}

void loop() {
  // read the pushbutton:
  int buttonState = digitalRead(buttonPin);
  // if the button state has changed,
  if (buttonState != previousButtonState) {
    // and it's currently pressed:
    if (buttonState == HIGH) {
      // increment the button counter
      counter++;
    }
    previousButtonState = buttonState;
  }
}
```
The budget is a line item (tabular) representation of the expenses associated with the proposal project. The Budget Justification contains more in-depth detail of the costs behind the line items, and sometimes explains the use of the funds where not evident.

Cost estimates need to be as accurate as possible to cover the expenses proposed in the project. Reviewers will note both over- and under-estimations.
### GANTT CHART

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CONTENT OUTLINE

• Chapter 4: Results Discussion
  • Result 1 - Simulation
    • Result
    • Discussion
  • Result 2 - Testing – breadboard
    • Result
    • Discussion
  • Result 3 - Project Performance
    • Results
    • Discussion
RESULT AND DISCUSSION

• Result
  • Presents a complete account of results and analyses of the study in the form of figures, tables or text so that the key information is conveyed and highlighted.

• Discussion
  • It discusses the result of the study in relation to the hypotheses. It highlight the main findings, their significant and implications
  • Explaining the outcome of the simulation and testing,.. Why?
• **Be concise**, using non-textual elements appropriately, such as figures and tables, to present results more effectively. In deciding what data to describe in your results section, you must clearly distinguish information that would normally be included in a proposal from any raw data or other content that could be included as an appendix.
RESULTS (SIMULATIONS)
RESULTS (TESTING)
RESULTS (PERFORMANCE)
RESULTS

- Avoid providing data that is not critical to answering the research question / problem. The background information you described in the introduction section should provide the reader with any additional context or explanation needed to understand the results.
DISCUSSION

• The purpose of the discussion is to interpret and describe the significance of your results in addressing the problem statements and the project’s objective/s. The discussion will always connect to the introduction by way of the research questions or hypotheses you posed and the literature you reviewed, but it does not simply repeat or rearrange the introduction; the discussion should always explain how your study/result has moved the reader's understanding of the research problem forward from where you left them at the end of the introduction.