

# CIT 103: Workshop Assignment #1(B)

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## Introduction

Problem Solving in real world involves understanding the context of the problem and providing the solution to it.

The problem however is present with constraints also. For a bike that doesn't start because of faulty spark plug, your friend might suggest to replace the bike with a brand new motorbike. Though, the problem appears to be solved, actually it becomes a way to avoid the problem. "You don't exchange your motorbikes for some minor faults."

In this lab you will explore the famous mathematical problems and produce a solution to the existing problems using algorithms and flowcharts.

## Approaching a Problem

Computer science is the study of problems, problem-solving, and the solutions that come out of the problem-solving process. Given a problem, a computer scientist's goal is to develop an algorithm, a step-by-step list of instructions for solving any instance of the problem that might arise. Algorithms are finite processes that if followed will solve the problem. Algorithms are solutions.

Computer science can be thought of as the study of algorithms. However, we must be careful to include the fact that some problems may not have a solution. Although proving this statement is beyond the scope of this text, the fact that some problems cannot be solved is important for those who study computer science. We can fully define computer science, then, by including both types of problems and stating that computer science is the study of solutions to problems as well as the study of problems with no solutions.

- Always start a problem with a plan: This is perhaps the most important rule. You must always have a plan, rather than engaging in directionless activity.
- Restate the Problem: Restating a problem is like circling the base of a hill that you must climb; before starting your climb, why not check out the hill from every angle to see whether there's an easier way up? Restatement sometimes shows us the goal was not what we thought it was.
- Divide the problem: Finding a way to divide a problem into steps or phases can make the problem much easier. If you can divide a problem into two pieces, you might think that each piece would be half as difficult to solve as the original whole, but usually, it's even easier than that.

## Lab Objective

To model the mathematical models for developing a computing algorithm.

- Write introduction to the problem at hand.
- Give a brief about the theory/concepts related to the problem.
- Describe your strategy using algorithm.
- Draw a flowchart to the algorithm.

### Question 1

Determine the impact speed for a ball in a given position and velocity, if the air resistance is neglected.

**i**

**Info:** Introduce the concept of gravity. Propose the mathematical models for speed.

### Question 2

Find the area of an ellipse.

**i**

**Info:** Introduce the concept of ellipse (for example: major-minor axis).

### Question 3

Find if a number is a power of 3 using logarithmic functions.

**i**

**Info:** Introduce the concept of logarithmic function. What kind of problems can be solved using logarithmic functions?