Research Process

**Identify and Select Security Analysis Tools**

Search for recent security analysis tools and the availability of their executable programs to be use to analyze a dataset of smart contracts.

**Research Motivation**

Identify the problem and the need for the research on security analysis tools of smart contracts.

**Writing Paper**

Write a research paper according to the results obtained from the analysis.

**Prepare Dataset of Smart Contracts**

Collect a dataset of labeled (Benchmark) unlabeled (Large) vulnerabilities of smart contracts

**Analyze the Recorded Output**

According to the RQs, analyze the outputs to answer the questions.

**Test Selected Security Analysis Tools**

Run each of the selected tools on the datasets and record the output and running time.

**Setting Research Questions (RQs)**

Formulate RQs so address the problem intended to solve.

**Review Literature**

Review relevant studies conducted on security analysis tools for smart contracts.

**Research Motivation**

In recent years, several smart contract analysis tools has been proposed. Accordingly, empirical studies has been conducted to analyze various aspects of the analysis tools. However, no study was conducted to identify the tools that detect most critical vulnerability such as security. Moreover, few efforts was made to assess the general performance of the state-of-the-art tools.

**Proposed Research Questions (RQs)**

**RQ1. Performance:** How many bugs can the tools find and how long does it take?

RQ1.1. How many bugs can the tools detect?

RQ1.2. How long does it take to analyze the contracts?

**RQ2. Effectiveness**: How accurate are the tools in detecting bugs, and which of them detect critical bugs like security?

RQ2.1. What is the effectiveness of the tools in detecting the bug?

RQ2.2. Which tools detect most critical bugs?

**Experimental Design Framework**

