**Software Security (502804-3)**

**Spring 2022**

**Due: Saturday March 26, 2022, 11:59 pm via Blackboard**

**SonarQube Lab**

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1. **Overview**

The learning objective of this lab is for students to understand how open-source platforms, namely SonarQube, perform automatic reviews with static analysis of code. SonarQube is an open-source platform developed by SonarSource for continuous inspection of code quality to perform automatic reviews with static analysis of code to detect bugs, code smells, and security vulnerabilities on 20+ programming languages. SonarQube offers reports on duplicated code, coding standards, unit tests, code coverage, code complexity, comments, bugs, and security vulnerabilities.

1. **Lab Tasks**

This lab covers the following three main tasks.

**2.1 Task 1: Installing SonarQube**

In this task, we aim to teach the students how to install SonarQube on their personal computers.

**Get Started in Two Minutes Guide**

**Installing from a zip file**

1. [Download](https://www.sonarqube.org/downloads/) the SonarQube Community Edition.
2. As a **non-root user**, unzip it, let's say in *C:\sonarqube* or */opt/sonarqube*.
3. As a **non-root user**, start the SonarQube Server:

# On Windows, execute:

C:\sonarqube\bin\windows-x86-xx\StartSonar.bat

# On other operating systems, as a non-root user execute:

/opt/sonarqube/bin/[OS]/sonar.sh console

 If your instance fails to start, check your [logs](https://docs.sonarqube.org/latest/setup/troubleshooting/) to find the cause.

1. Log in to [http://localhost:9000](http://localhost:9000/) with System Administrator credentials (login=admin, password=admin).
2. Click the **Create new project** button to analyze your first project.

**Using Docker**

Images of the Community, Developer, and Enterprise Editions are available on [Docker Hub](https://hub.docker.com/_/sonarqube/).

1. Start the server by running:

$ docker run -d --name sonarqube -p 9000:9000 <image\_name>

1. Log in to [http://localhost:9000](http://localhost:9000/) with System Administrator credentials (login=admin, password=admin).
2. Click the **Create new project** button to analyze your first project.

**Deliverable: Attach a screenshot of the SonarQube installed on your machine.**

* 1. **Task 2: Vulnerable Programming · SonarQube**

In this task, we aim to teach the students how to use SonarQube to analyze a simple C++ code.

Step 1: Write a simple C++ code. Note you may read online and find different code vulnerabilities.

Step 2: Use SonarQube to evaluate the C++ code you wrote. Explain the code vulnerabilities you have found.

**Deliverable:**

* 1. **Send me your “vulnerable” C++ code.**
  2. **Screenshot your SonarQube analysis.**
  3. **Task 3: Secure Programming · SonarQube**

In this task, we aim to teach the students how to use SonarQube to evaluate a simple C++ code.

Step 1: Make your code secure by eliminating the defined vulnerabilities in the previous task.

Step 2: Use SonarQube again to make sure that your C++ code is now secure and no vulnerabilities.

**Deliverable:**

* 1. **Send me your “secure” C++ code.**
  2. **Screenshot your SonarQube analysis.**