ABSTRACT

The Security Lab Manager is a web application that manages vulnerable virtual machines for users to practice cyber security on. Users only need to login to the website to get started – no setting up environments or downloading software. Each exercise has unique answers for students – so answer sharing isn’t viable. Administrators can create, edit, and view: classes, exercises, and users. Grades can be emailed out automatically.

PROBLEM

Security training is desired in all parts of industry: secure coding for developers, Q/A Testers, and Security Engineers. There are several virtual machines to practice security, but none have a student-teacher model. Students can now easily begin learning security with just this application. The table below compares current options for learning security, bring your own device(BYOD), using VMware virtual machines, or this app.

<table>
<thead>
<tr>
<th></th>
<th>Secure</th>
<th>Efficient</th>
<th>Functional</th>
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<tbody>
<tr>
<td>BYOD</td>
<td>Safe</td>
<td>Scales to performance needs</td>
<td>Student and instructor tasks can be easily done in seconds through the GUI</td>
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<tr>
<td>VMware virtual machines</td>
<td>Secure and vulnerable exercises</td>
<td>Secure web portal</td>
<td>The Docker Software Development Kit allows virtual machines to be built, started, and stopped in under 20 seconds</td>
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<td>This app</td>
<td>Simulates various virtual machines</td>
<td>Jenkins runs Anchore, Sonarqube, and ZAP scans</td>
<td>Development Kit allows for creating, editing, deleting: classes, exercises, and students</td>
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DESIGN

OS Level

REST Framework

Docker SDK

Database

RESULTS

☑️ Launch exercises via GUI
☑️ Automatic grading/emailing
☑️ Configure all data via GUI

Summary

The application met all requirements, is much more efficient than using virtual machines, and helps students learn security in a hands-on way.