Analysis of Alternatives - Programming Language

# Summary:

The purpose of this document is to compare different programming languages to determine which is the optimal choice for this project. The languages being considered are Java, JavaScript and Python. The language chosen best satisfies the criteria of: ease of use, performance, cost and suitability. The language that best satisfied all criteria and will be used in the project was JavaScript.

# Terms of Reference:

## 2.1 Current alternatives:

* Java
* JavaScript
* Python

## 2.2 Criteria:

|  |  |  |  |
| --- | --- | --- | --- |
| Criterion | Description | Importance | Ranking Explanation |
| Suitability | This criterion refers to how effective the programming language can be used to create a web application and utilize the google API. | 1 | If the programming language cannot effectively be used to complete either task in the description, then it is not viable to be used in this project. |
| Performance | This criterion refers to how efficiently the web application runs as a result of the language and how efficiently the language communicates to the google API. | 2 | It is important that the end product performs its functions as quickly as possible, to ensure the users are satisfied with the product. |
| Ease of use | This criterion refers to the relative difficulty members of the team will have working with a specific language, due to the amount of previous exposure and complexity of the language itself. | 3 | Members of the group will need to use this language to complete the project, it is not crucial that each member has a complete working knowledge of the language as this can be learned on the job, but some previous knowledge would be favourable. |
| Cost | This criterion refers to any cost using the language such as downloading new IDE’s, learning new language syntax, downloading language specific extensions or libraries etc. | 4 | Least important of the criteria as these costs have no critical impact on the success of the project. |

## 2.3 How criteria will be used:

Each of the programming languages will be given a score out of 5, 5 being the highest score and 1 being the lowest score. Each of the criteria are weighted on their importance. As suitability was deemed the most important criterion the score out of 5 will be multiplied by 4. Conversely as cost was deemed the least important criterion it receives a weight of 1. The programming language that receives the largest score will be the most suitable for the project.

# Evaluation of alternatives:

## 3.1 Java:

### 3.1.1 Advantages:

* Is effective using the google API restful.
* Java is robust, because it has a strong it provides strong exception handling and type checking mechanisms compared to other languages.
* Java is the most secure language out of the three alternatives.
* Java runs on any platform.

### 3.1.2 Disadvantages:

* Java requires a high storage capacity and as it uses more memory than other programming languages.
* Most of the team has no prior experience using Java and those that do have not used Java in a web application in conjunction to google API.

## 3.2 JavaScript:

### 3.2.1 Advantages:

* All members of the group have web design experience with JavaScript in ENG1003.
* JavaScript is supported by all of the popular web browsers.
* Java is fast as it is client side and therefore reduces the load on the server.
* JavaScript works in conjunction with google API.

### 3.2.2 Disadvantages:

* While the client-side nature improves speed of communication between machine and server this also introduces a security risk. Code is executed on the user’s computer, and this is exploited and used to launch malicious attacks on machines.
* While JavaScript is supported by most browsers, these browsers can occasionally interpret the code slightly differently.

## 3.3 Python:

### 3.3.1 Advantages:

* All members have experience coding with python in previous units.
* Python requires less code to produce a function as it is a syntactically simple language.

### 3.3.2 Disadvantages:

* While all members of the group are comfortable coding in python, collectively there is no prior knowledge amongst members of using python in a web application in conjunction to google API
* Slow because it is an interpreted language.
* High cost with API, in terms of learning how to use python with google API.
* Not supported by all web browsers.

## 3.4 Summary:

|  |  |  |  |
| --- | --- | --- | --- |
|  | Java | JavaScript | Python |
| Suitability | 5\*4 | 5\*4 | 3\*4 |
| Performance | 4\*3 | 5\*3 | 3\*3 |
| Ease of use | 3\*2 | 4\*2 | 4\*2 |
| Cost | 4\*1 | 4\*1 | 3\*1 |
| Total | 38 | 47 | 34 |

# 4.0 Recommendation:

JavaScript is the alternative that best fulfils the criteria. It is the most suitable as it is supported by most browsers and can communicate with the google API effectively. Furthermore, it’s client-side design results in the highest performance. This alternative also has the advantage of all members of the group has previous experience with the language in a web development project. While it does have some security concerns, there was not a heavy emphasis placed on the security of the project by the client, ensuring JavaScript is the optimal choice.