

BigMAK

CPS1010 - Collaborative Practical Project

Lecturer: Dr Mark Micallef

Customer: Dr Christian Colombo

Date: 26/04/2018

GitHub: <https://github.com/TeamBigMAK/NotCPS1010Project>

Politikapp

Project By:

- *Aidan Cauchi - 92399(M)*
- *Karl Grech - 258498(M)*
- *Matthew Alan Le Brun - 165599(M)*

INITIAL PROJECT SETUP

SOURCE CONTROL TOOLS

The team made use of **Git** and **GitHub** to store their online repository. During the initial phase of the project, every member worked on their own separate branch. After the team gained confidence with the technologies being used, they started to make use of the master branch to connect the different modules together.

CONTINUOUS INTEGRATION SERVER

Continuous Integration: Jenkins

The team ran into a number of problems whilst trying to set up the continuous integration tools. The first problem arose from Javascript being a language that does not compile, and so the client side code could not be compiled to ensure it builds correctly. Furthermore, the team also made use of NodeJS. Here the team could still not verify whether the program was executing correctly for reasons similar to the halting problem. Since NodeJS is used for server side functionality, when Jenkins ran the program (using the Bash shell), it would end up starting the server. Thus, would never be able to determine whether the server code terminates correctly, as the point of a server is to run indefinitely. Moreover, even when the team deliberately pushed faulty code to github to test whether Jenkins would produce an error, Jenkins would still output a success message. To try and workaround this, the team installed the NodeJS Jenkins plugin. Due to the fact that the University Jenkins server was having trouble installing the plugin, the team decided that they would host a local server. Despite this, it was found out that the plugin was not executing the server file but rather executed its own scripts and was still generating errors. Additionally, the team also tried to run the server for a number of seconds and then terminate it, but this still kept producing errors. Having tried all this, the team decided that it would be best to focus their efforts on the actual software program since they were working efficiently without continuous integration tools.

Figure 1: NodeJS Plugin Installed

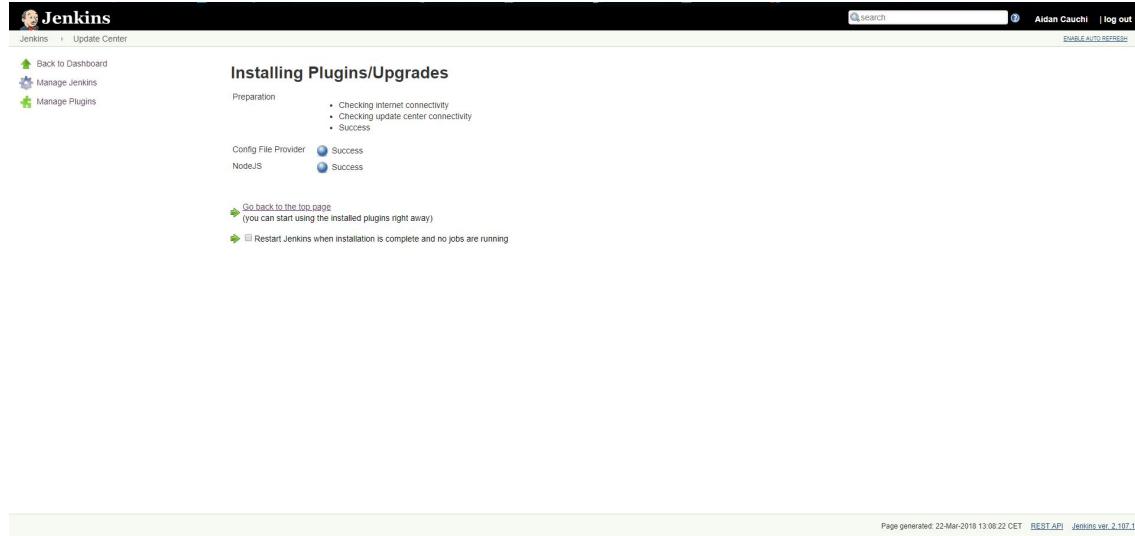


Figure 2: Repository and Branches

The screenshot shows the 'Source Code Management' configuration page for a Jenkins job. The 'Source Code Management' tab is selected. Under 'General', the 'Repository' dropdown is set to 'Git'. In the 'Repositories' section, the 'Repository URL' is set to 'https://github.com/TeamBigMAK/NotCPS1010Project' and the 'Credentials' dropdown is set to '- none -'. There are four entries in the 'Branches to build' section, each with a 'Branch Specifier (blank for 'any')': '/master', '/aidanBranch', '/mattBranch', and '/karlitoBranch'. At the bottom, the 'Repository browser' is set to '(Auto)' and the 'Additional Behaviours' dropdown is set to 'Add'. There are also 'Advanced...' and 'Add Repository' buttons.

Figure 3: NodeJS Build Environment



Figure 4: Build Not Terminating

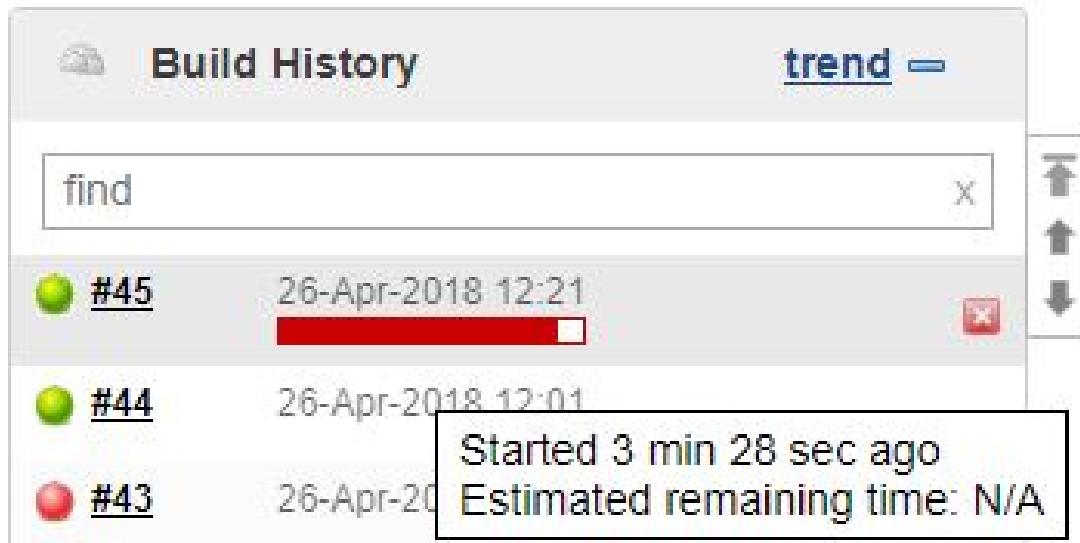


Figure 5: Email Notifications

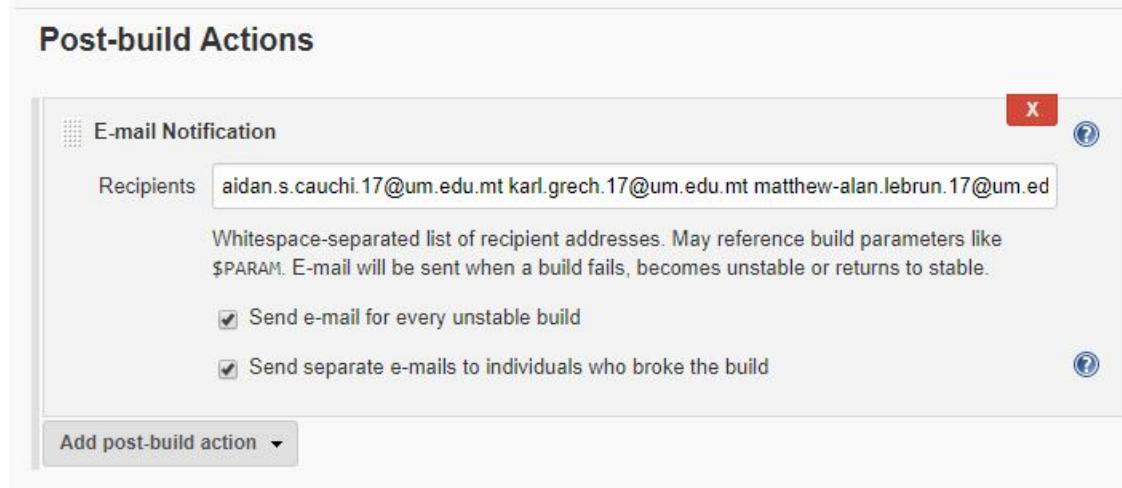


Figure 6: Windows Batch Command Used to Run Node



Figure 7: Sample Console Output

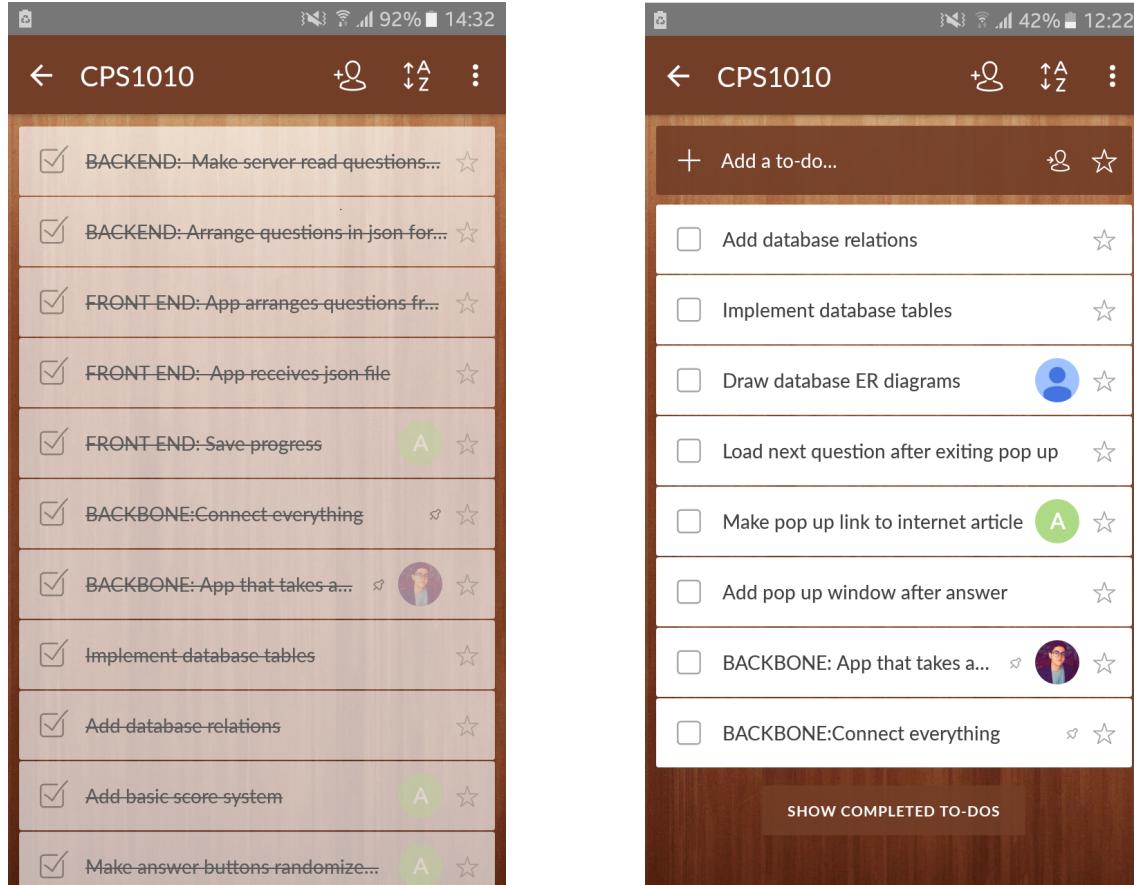
 **Console Output**

```
12:21:11 Started by user Aidan Cauchi
12:21:11 Building in workspace D:\Jenkins\workspace\CPS1010_BigMAK
12:21:11 > git.exe rev-parse --is-inside-work-tree # timeout=10
12:21:11 Fetching changes from the remote Git repository
12:21:11 > git.exe config remote.origin.url https://github.com/TeamBigMAK/NotCPS1010Project # timeout=10
12:21:11 Fetching upstream changes from https://github.com/TeamBigMAK/NotCPS1010Project
12:21:11 > git.exe --version # timeout=10
12:21:12 > git.exe fetch --tags --progress https://github.com/TeamBigMAK/NotCPS1010Project +refs/heads/*:refs/remotes/origin/*
12:21:22 > git.exe rev-parse "refs/remotes/origin/master^{commit}" # timeout=10
12:21:22 > git.exe rev-parse "refs/remotes/origin/origin/master^{commit}" # timeout=10
12:21:22 Checking out Revision a14e8fb648378a307fd0b1134d36f8b665fa9d65 (refs/remotes/origin/master)
12:21:22 > git.exe config core.sparsecheckout # timeout=10
12:21:23 > git.exe checkout -f a14e8fb648378a307fd0b1134d36f8b665fa9d65
12:21:24 Commit message: "removed node modules folder from gitignore"
12:21:24 > git.exe rev-list --no-walk b9e83dde578e54fc54fcf4dbae7cac1c7752ac2 # timeout=10
12:21:24 [CPS1010_BigMAK] $ D:\Git\git-bash.exe -xe C:\WINDOWS\TEMP\jenkins3903511547446553866.sh
```

COMMUNICATION TOOLS

To communicate while away from each other, the team made use of the '**Facebook Messenger**' App for sending quick messages and planning meet ups or updating other team members of their progress so far. For iteration plans/goals, the team made use of an app called '**Wunderlist**', where they were able to list all the objectives and assign them to individual team members, in an online shared list(a sort of team wall).

Figure 8: Wunderlist Completed and Open Tasks



BUG TRACKING

For bug tracking the team mostly made use of the 'Wunderlist' application (mentioned in the Communication Tools section) to take note of bugs to fix. Occasionally, GitHub's bug tracking feature was also used for bugs that wouldn't get fixed within iteration deadlines.

Figure 9: Github Issue Tracking

The screenshot shows the GitHub repository page for 'TeamBigMAK / NotCPS1010Project'. At the top, there are buttons for 'Code', 'Issues 1', 'Pull requests 0', 'Projects 0', 'Wiki', 'Insights', and 'Settings'. To the right are buttons for 'Watch 0', 'Star 0', and 'Fork 0'. Below these are sections for 'Label issues and pull requests for new contributors' and 'Filters' (set to 'is:issue is:open'). The main list shows one open issue: '#1 External Article Link not working inside phonegap bug'. A note says '#1 opened 12 seconds ago by Aidan-Cauchi'. A 'ProTip!' link is at the bottom.

Figure 10: Fixed Bug from GitHub Bug Tracker

This screenshot shows the same GitHub repository page after the bug has been fixed. The 'Issues' tab still shows 1 issue, but it is now closed. The issue details remain the same: '#1 External Article Link not working inside phonegap bug' (closed by Aidan-Cauchi 12 seconds ago). The 'Filters' are now set to 'is:issue is:closed'.

PROCESS PARAMETERS

The team agreed to have iteration sprints of two weeks length. In addition, weekly group meetings were held in the education building on University Campus every Thursday at 11:00am. The team would discuss what was done during that week, address any pressing issues and work concurrently for an average period of three hours.

PROCESS EVOLUTION

ITERATION 0

Client Meeting: 06/02/18

Discussion:

In this meeting, the client expressed his desire to change the assigned idea to his own. The idea consisted of a fun politically related quiz with the aim of helping people get to know more about politics and help to distinguish whether the "neutral/independent" sources they are getting their information from are actually neutral after all.

App requirements:

- Cross platform availabilities for the App (being usable on Android, iOS, Windows devices)
- Anonymity through avoiding any sort of account making and login pages. Also, no need for the user to enter their real name and personal details but use a nickname instead.
- Scores for each user are sent and stored in a database. These can be then used to aid in statistical researches for example.
- Ability of the administrator (person in charge of the questions) to add new questions through a custom email. Questions are stored in a table in a database and questions are then updated and shown to the player.
- App Name and logo, however minimal importance to be given as of yet.

Goals for next iteration:

Research about possible tools that can be used in the development of the app such as communication tools and proper tools for the design and structure of the application.

Internal Meeting: 08/02/18

- Agreement of the programming languages to be used - **JavaScript, NodeJS, Angular, HTML, CSS**
- Discussion of application to be used to convert JS to android and iOS - **PhoneGap** was found and tested
- Set period of research (up until the following iteration) to research and practice discussed technologies.

Internal Meeting: 15/02/18

Postponed to the following week as 2 members were abroad.

ITERATION 1

Client Meeting: 20/02/18

Discussion:

In this meeting, the client provided an in depth visual suggestion of how the system would work. The system was to be split in two:

The Server Side, which will store all questions and answers in a database and handle all requests for questions from clients.

The Client Side, including the visual representation and client functionality of the app.

Internal Meeting: 15/02/18

User stories were created.

Basic Structure (backbone):

- Create database (with 1 table having 1 attribute) - **20pts**
- Create JS based server - **63pts**
- Simple one page PhoneGap application - **5pts**
- Establish links - **20pts**

total: **108pts**

Front End Design:

- Question Page - **20pts**
- Menu - **6pts**
- Share Results - **20pts**
- Colour Scheme - **5pts**

total: **51pts**

Back End Design:

- Requests for new questions - **13pts**
- Store offline sessions and handle repetition - **15pts**
- Design of full DB - **32pts**

total: **60pts**

Other:

- Create domain - **8pts**
- Adding new questions through email - **30pts**

total: **38pts**

Grand total of **257pts** - *Fun fact: 257 is also the number of calories in every 100g of a BigMac*

Sprints overview:

The Project should be finished within 5 iterations, completing approximately 50pts per iteration.

- Iteration 1 - Create server - **63pts**
- Iteration 2 - Finish backbone - **45pts**
- Iteration 3 - Design of full DB + Question page - **52pts**
- Iteration 4 - Finish back end + Finish front end - **59pts**
- Iteration 5 - Create domain + Addign new questions through email - **38pts**

Internal Meeting: 22/02/18

- The team individually attempted to create a NodeJS app for the meeting
- A period of time was dedicated to bugfixing eachother's code
- Connected a database to a NodeJS server
- GitHub setup completed
- Wunderlist set up and tasks were assigned

ITERATION 2

Client Meeting: 06/03/18

Discussion:

The main focus of the meeting was discussing with the client the breakdown of the processes required to construct the applicaton and assigning them a score based on how difficult the team thought they were and how much time they would take to finish. The client pointed out that he would prefer to give a little more importance to the visual representation of the app, but other than that, he agreed with the assignment of user story points.

Internal Meeting: 08/03/18

Due to the client's concern in the visual aesthetics of the application, a team member was assigned to begin working on the user interface whilst the other two continued to work on the backend.

Internal Meeting: 15/03/18

This meeting was dedicated solely to bugfixing backend issues that the team was struggling to resolve.

ITERATION 3

Client Meeting: 16/03/18

Discussion:

Source of questions - The client explained to the team how he would go about creating new questions. He was to form a small committee that would agree or disagree whether a particular news source was neutral. This would ensure that the questions would be as unbiased as possible to prevent any controversy and to further emphasize the aim of educating the user about local politics.

Type of questions - Two of the considerations mentioned for the quiz were the type of questions involved and the option to include a True or False type of question rather than only a multiple choice type of question.

JSON required - JSON stands for JavaScript Object Notation. The client talked about what JSON layout would be required for the application to handle the questions. The JSON would consist of the actual question, the correct answer, the wrong answers and the article link from where the answer was brought.

Internal Meeting: 22/03/18

The team had been keeping up well with the iteration plan. Since this meeting was to be the last before Easter recess, tasks were set for each member to work on and present after the recess finished. Matthew was to work on the database design, Karl on the visuals of the question page and Aidan was to begin adding application functionalities.

ITERATION 4

Client Meeting: 10/04/18

Discussion:

Visual overview - The application was showcased to the client, pin-pointing the visual updates the team worked on. Functionalities added included the randomisation of the ordering of answers each

time the game is refreshed.

Releasing and Timing - The timing of when to release the application was discussed since releasing it in the correct period (such as the budget or election period) will add a certain likeliness that the user takes interest in the application.

Further considerations - More discussions were held on the application being in a somewhat restricted market. Considering that it is a quiz, focusing mainly on political education. Consequently, for a large percentage of teenagers (and even the population), the application might be seen as boring despite it being beneficial. Therefore, it is imperative to add certain functionalities so as to make the application fun (and even somewhat addicting) to use. This also depends on how well the application looks so the aim is to make it as attractive as possible.

Score System - The client took the opportunity to specify the rules for the scores. The user/player receives:

- 10 points if they guess the answer on the first try
- 5 points if they guess the answer on the second try

This would help create a more competitive environment to help engage the users even more.

Possible game modes - The customer also mentioned the idea of adding different game modes such that the user is not limited to playing just a quiz but for example a game in which you have to match the correct title of an article to which newspaper source published it by dragging and dropping it.

Customization - With regards to display, the customer focused on the fact that more importance should be given on how the application looks on a phone rather than on desktop putting emphasis on customizing it more for small screens rather than large ones.

Hosting Solution - The client wished for a hosting solution where the server may be temporarily run whilst the development of the app continues. This was requested in order for the client to receive feedback from other sources outside of university.

Goals for next iteration:

- Work on implementing the score feature correctly
- Focus on adapting the app and the app layout (windows, buttons.etc) for mobile displays rather than desktop displays.
- Connecting the back end to the front end
- Search/look for server hosting solutions and present them to the customer in the next meeting

Internal Meeting: 12/04/18

The final internal meeting focused around polishing up the minor inconsistencies in all the areas

of the application. The team ensured that there was a fully functional link between the database, server and client - which could be accessed from any mobile device on the same network as the server.

ITERATION 5

Client Meeting: 24/04/18

What was presented:

Final connection - The core element the team presented was the connection of the backend (mainly the database and the items [questions, correct answers, etc]) to the front end (the app and its features). This was possibly the most challenging yet crucial part of the whole project as it would ensure that basis of the product was working correctly and everything could be scaled up from here.

Added functionalities - The load feature was successfully implemented and demonstrated in the scenario that a user starts playing but does not complete all the available questions. By pressing the load button, the user will be taken to the question from where they left off.

Discussion:

Added functionalities - The client was very satisfied with how the team managed to connect everything and also with how the score system was implemented.

Considerations of Hosting Solutions - The server hosting solutions were discussed with the client. The price concern with regards to hosting a whole/single server was raised since the prices were very expensive and it was agreed that the best approach would be shared hosting since they are cheaper. The team knew that hosting the application on a public server was something the client wanted to see so as to be able to show the application to other people who might give feedback both on the application.

UI Considerations - Some more refinements were to be made to the UI, mainly with regards to the overlay, that appears after a question was answered.

The client inquired as to whether the responses/clicks of the user were being sent to a database or if any data was being used for statistical purposes. However the team had to delay this feature as priorities shifted throughout the development of the application.

Suggestions on start-up - After testing the new features, the client stated that according to him, the user should not have to see the play button each time the app is started. It was suggested that the play button would appear only for the first time the application is loaded(or after resetting progress). Furthermore, the client did not want any sort of menu whenever the app is loaded (apart from the first time). The client saw it better that the user is immediately shown the next question upon launching the application.

Final Verdict - The client was very impressed with how the team's work was carried out overall

and also the way in which the work was organised, split into iterations and stated considerations of working together on this application in the coming Summer. This encouraged the team as it was taken as a sign that the customer was satisfied.

TESTING

AD-HOC TESTING

What is it?

An informal testing approach done without any reference to any plan or test cases usually with the aim of breaking the system and detecting which defects lead to this. One of the key elements in this type of testing is improvisation; where the testers do what deems necessary to find any bugs in the code. An in-depth knowledge of the system is a crucial requirement.

How was it used?

Ad-hoc testing was used in various stages of the app development, considering that the team was working within short deadlines whilst managing other school work, thus having no time to formally write tests. At later stages of the development, when the front-end had started to connect with the back-end, the team tried to find bugs by interacting with it and finding possible routes (that a user could potentially take) that could lead to errors.

BOTTOM-UP TESTING

What is it?

Bottom-up testing is one of the many possible approaches to integration testing. Rather than create the main module and then move on to sub module; bottom up inverts the approach and the developers first work on the (smaller) sub-modules, and each time adding up the latter modules to go up one level to a module that incorporates these sub-modules. If you visualize it, it is sort of a pyramid where the main/final module is the point on the top and as you go further down, you will find the stuff that sustains/makes up the core thing. In bottom up we start from the bottom of the pyramid and keep building on it till we reach the top.

How was it used?

With the idea of the pyramid in mind, the top part is considered to be the finished application. To give some examples, creating the database tables (with all the questions and other information) was a vital step in the whole process, and although this was a big step, it still was considered a sub-module since it helped in creating the final thing. Handling the questions in the front end was also another sub-module with its own sub-modules. The aim of this type of testing was to ensure that each module was able to work as expected on its own.

INTEGRATION TESTING

What is it?

Integration testing is concerned with testing how different modules interact in cohesion, rather than with the individual modules themselves. It is used to identify situations such as data being lost between modules, one module creating a fault in another module and creating a major undesirable

side-effect when combining modules.

How was it used?

This was an essential type of testing especially at later stages when the database was successfully created and the front-end along with all the javascript scripts were done. Whilst bottom-up testing was used to ensure that the different modules were working as expected on their own, integration testing was used to ensure that the different modules could interact with each other without errors. Examples of this include connecting the back-end system with the front-end system.

CUSTOMER FEEDBACK

The following pages contain the customer feedback form review.

08/05/2018

BigMAK Feedback Form

BigMAK Feedback Form

Please let us know about your experience working with BigMAK

Did BigMAK stick to deadlines?

1 2 3 4 5

Poorly Very well

Was the team easy to communicate with?

1 2 3 4 5

Not at all Very much so

Did the team produce consistent satisfactory work?

1 2 3 4 5

Not at all Very much so

How satisfied are you with the finished product?

1 2 3 4 5

Very little Greatly

Would you refer BigMAK to a friend or colleague?

Yes

No

08/05/2018

BigMAK Feedback Form

Additional comments for the team:

I am very happy to work with you. Obviously the reason I am not completely "satisfied with the finished product" is because it is incomplete.

Some more detail over the above:

- ++ I felt that you were understanding the requirements well as well as the priorities to each requirement
- ++ The team worked consistently from one iteration to the next
- ++ There was a lot of enthusiasm and it was great that the team was coming up with ideas
- ++ On time (except because of lecture)
- ++ Had a clear plan and followed it
- ++ Work was distributed across the team
- ++ Meetings had an agenda

Some points for possible improvement

- Sometimes emails were not efficiently answered (also I suggest all the team is kept in email threads)

Feel free to contact me if you wish further comments

This form was created inside University of Malta.

Google Forms

PROGRAM WALKTHROUGH

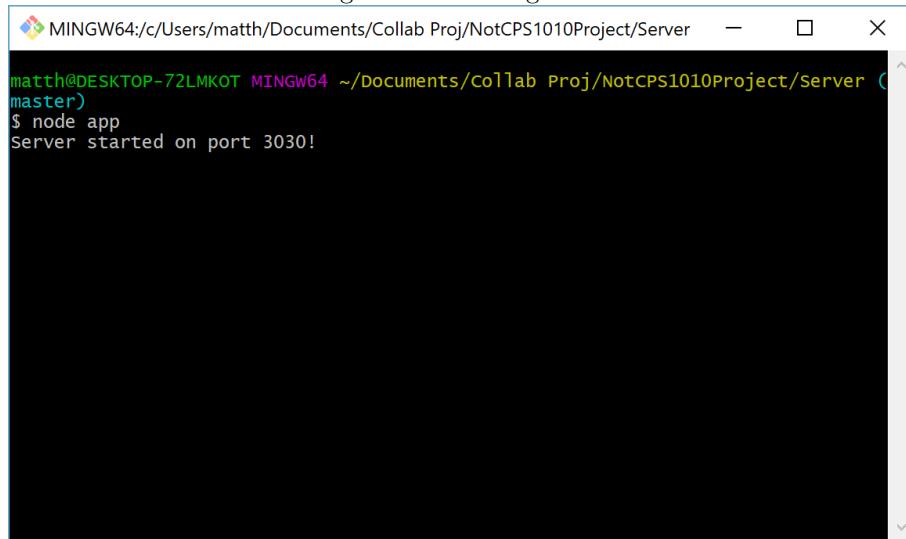
To facilitate testing, the team decided that it would be best to work with a web based application(for compatibility).

Upon connecting to the PhoneGap server (which was used for testing) the user is greeted with the menu screen. Furthermore, when the user connects to the server/website, a signal is sent to the backend server to retrieve the questions from the database and send them back to the phone, where they are organized for the play session. Moreover, in the menu screen, the user may choose to select one of three buttons: Play, Options and Load. The options button currently lacks any functionality as it was placed there for UI testing.

Pressing the play button causes the app to start loading the questions and to reset previously saved data. Each question has a question number, the question itself, 3 wrong answers and 1 correct answer. Should the user press the correct answer during the first try, they are immediately congratulated, given 10 points and are given the option to either continue playing or learn more about the topic of the question. Otherwise, they are expected to try again for one last time but are rewarded 5 points if they get it right during the second try. If the user fails to answer the questions within both tries, the application displays the correct answer and loads the next question. It is important to know that the app saves user progress after every question the user answers.

If the user presses the load button instead, they would continue playing from the question number they previously stopped at.

Figure 11: Starting server



```
MINGW64:/c/Users/matth/Documents/Collab Proj/NotCPS1010Project/Server matth@DESKTOP-72LMKOT MINGW64 ~/Documents/collab Proj/NotCPS1010Project/server [master] $ node app Server started on port 3030!
```

Figure 12: Server root

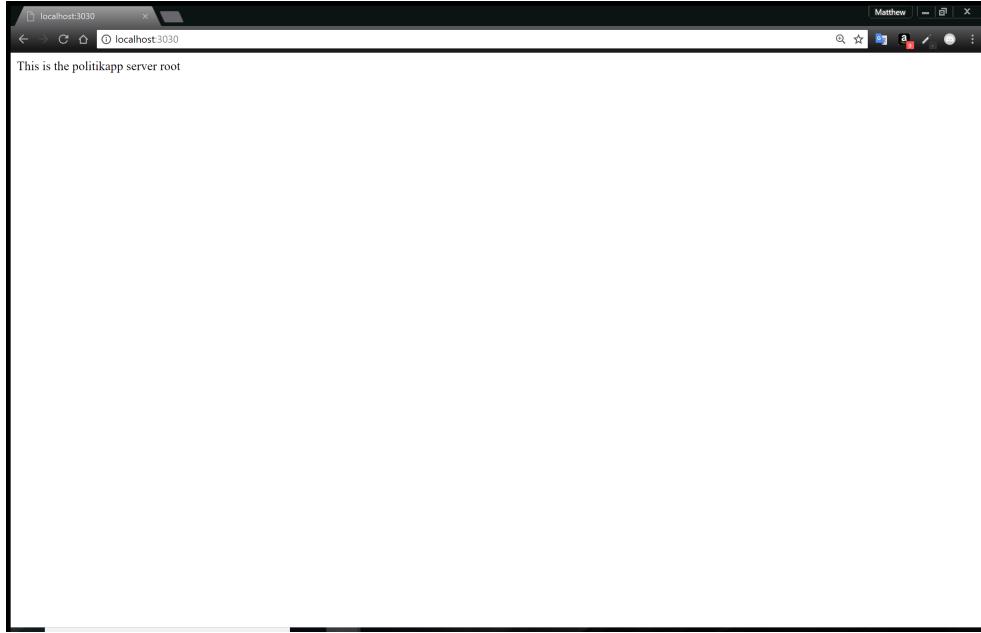


Figure 13: Database sample query

The screenshot shows the pgAdmin 4 interface. On the left, the Browser pane displays the database structure under 'Servers (1)'. The 'politiapp' database is selected, showing tables like 'ans', 'gpt', and 'qst'. The main window has tabs for 'Dashboard', 'Properties', 'SQL', 'Statistics', 'Dependencies', 'Dependents', and 'Query - politikapp on postgres@PostgreSQL 10 (x86)'. The 'SQL' tab contains the query:

```

1 SELECT * FROM ans
2

```

The 'Data Output' tab shows the results of the query:

aid	answer	correct	qid
1	55.000	false	1
2	125.000	true	1
3	436.000	false	1
4	1.125.000	false	1
5	Fug NetTV	false	2
6	Fug SuperOne	false	2
7	Fug il-website tal-Malta Bro...	false	2
8	Fug il-website tal NSO	true	2
9	9 9%	false	3
10	10 12%	false	3
11	18%	true	3
12	25%	false	3
13	Kull persuna kemm tista tga...	true	4
14	Kull persuna kemm hija int...	false	4
15	Kull persuna kemm għandu...	false	4
16	Kull persuna kemm tista tag...	false	4
17	Midja tal PN	true	5
18	Midja tal PL	false	5
19	Midja indipendent	false	5
20	Press release ufficjal	false	5

Figure 14: Phonegap server

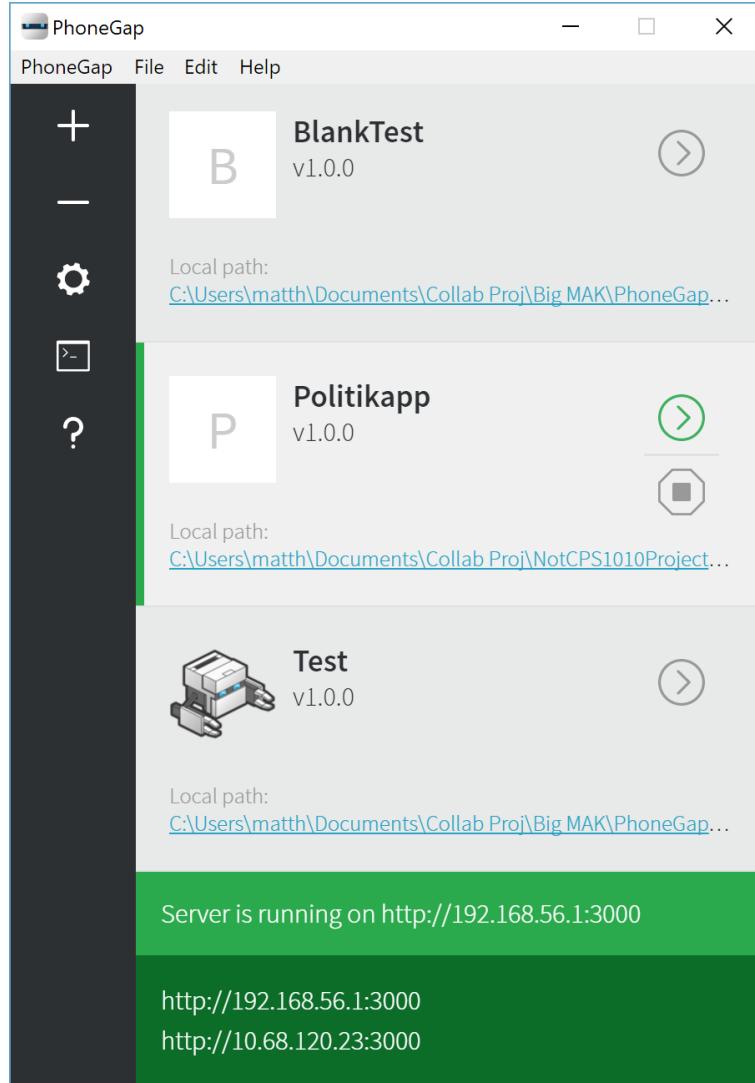


Figure 15: Client application (web)

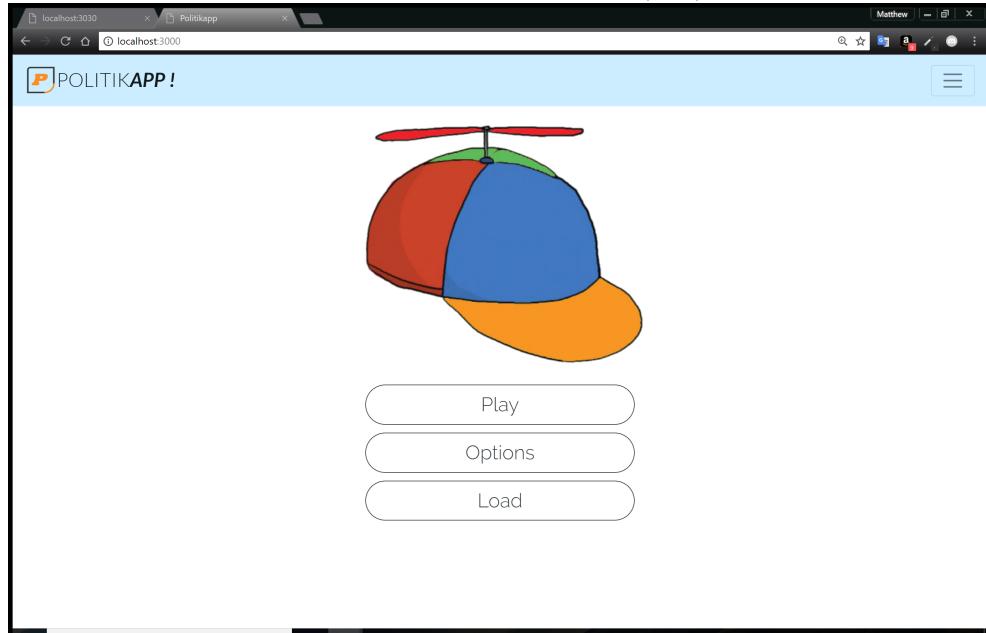


Figure 16: Selecting an answer

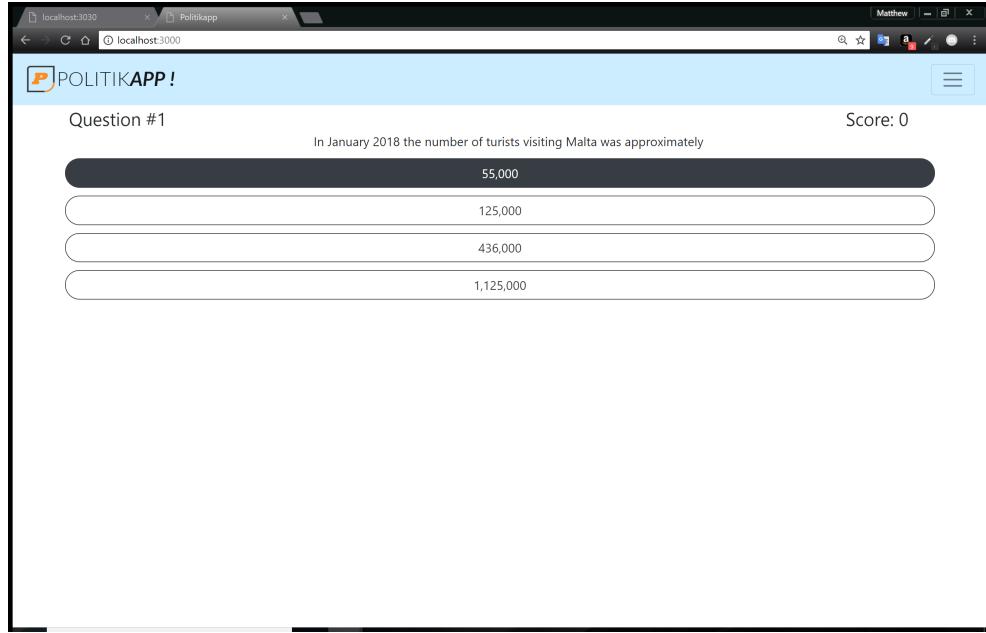


Figure 17: Incorrect selection

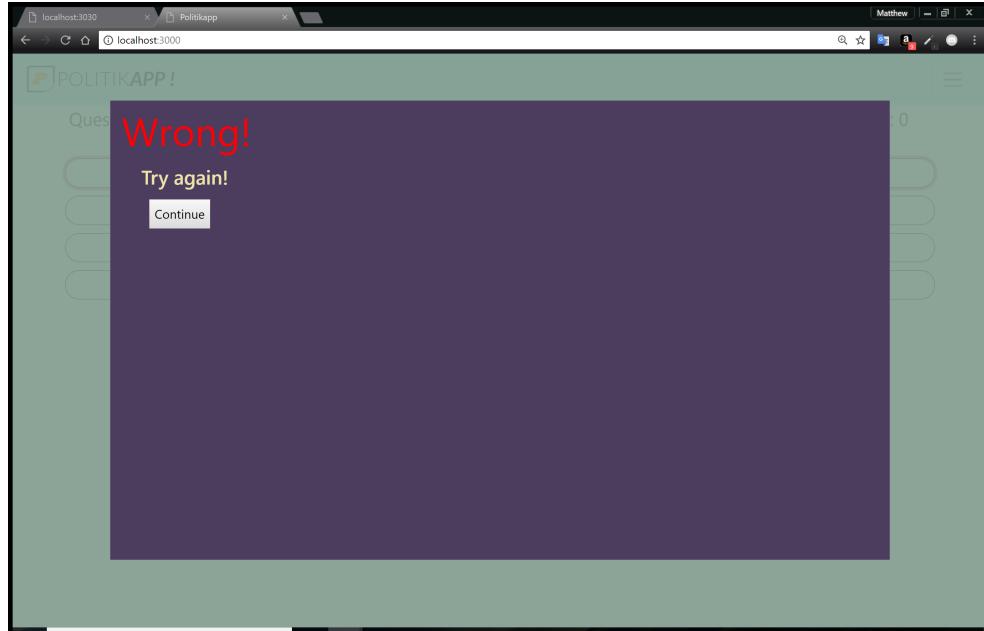


Figure 18: Question retake

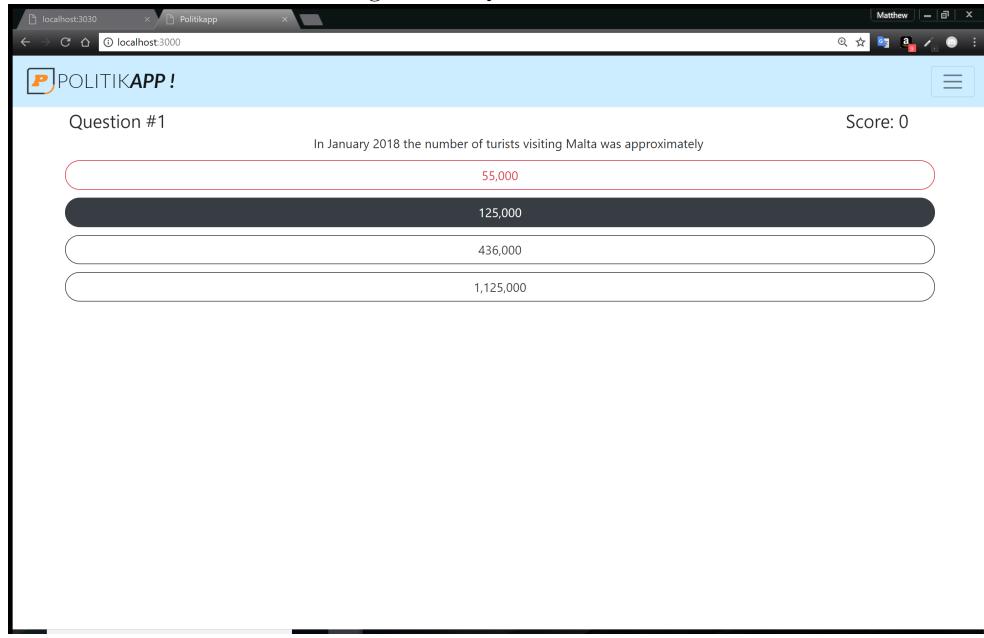


Figure 19: Correct selection

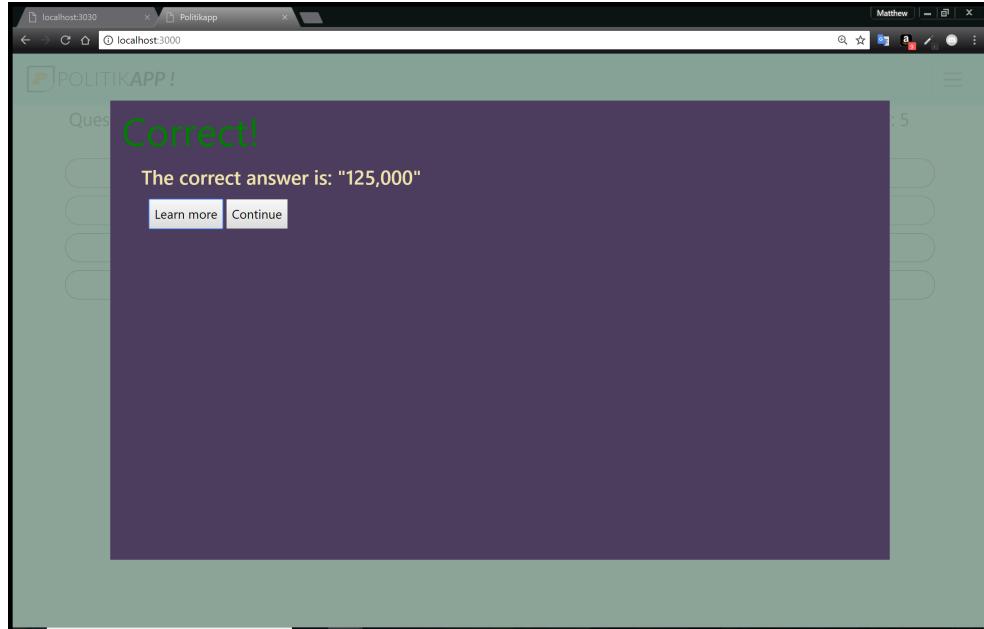


Figure 20: Score change

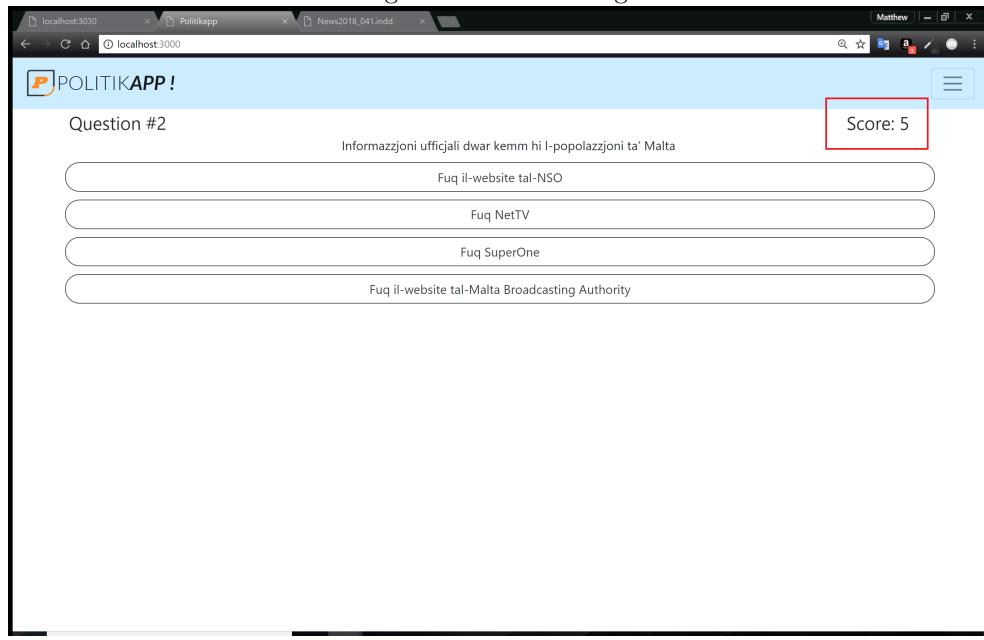


Figure 21: Client application (mobile)

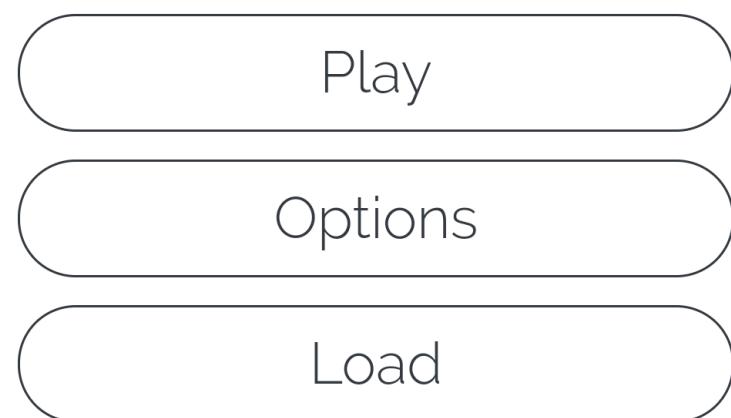
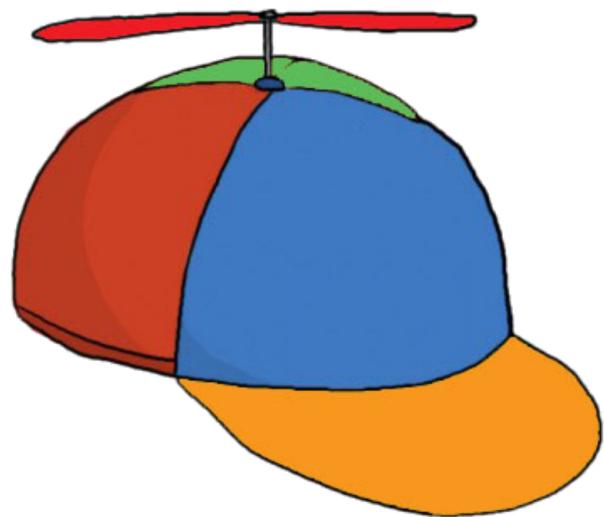
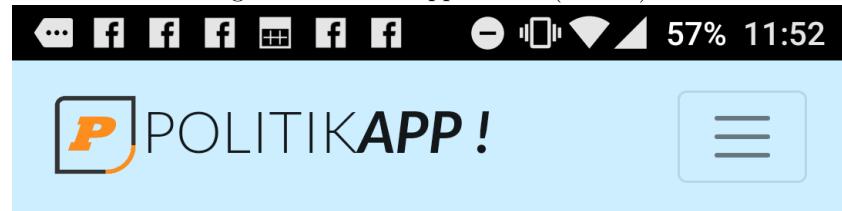


Figure 22: Correct answer (mobile)

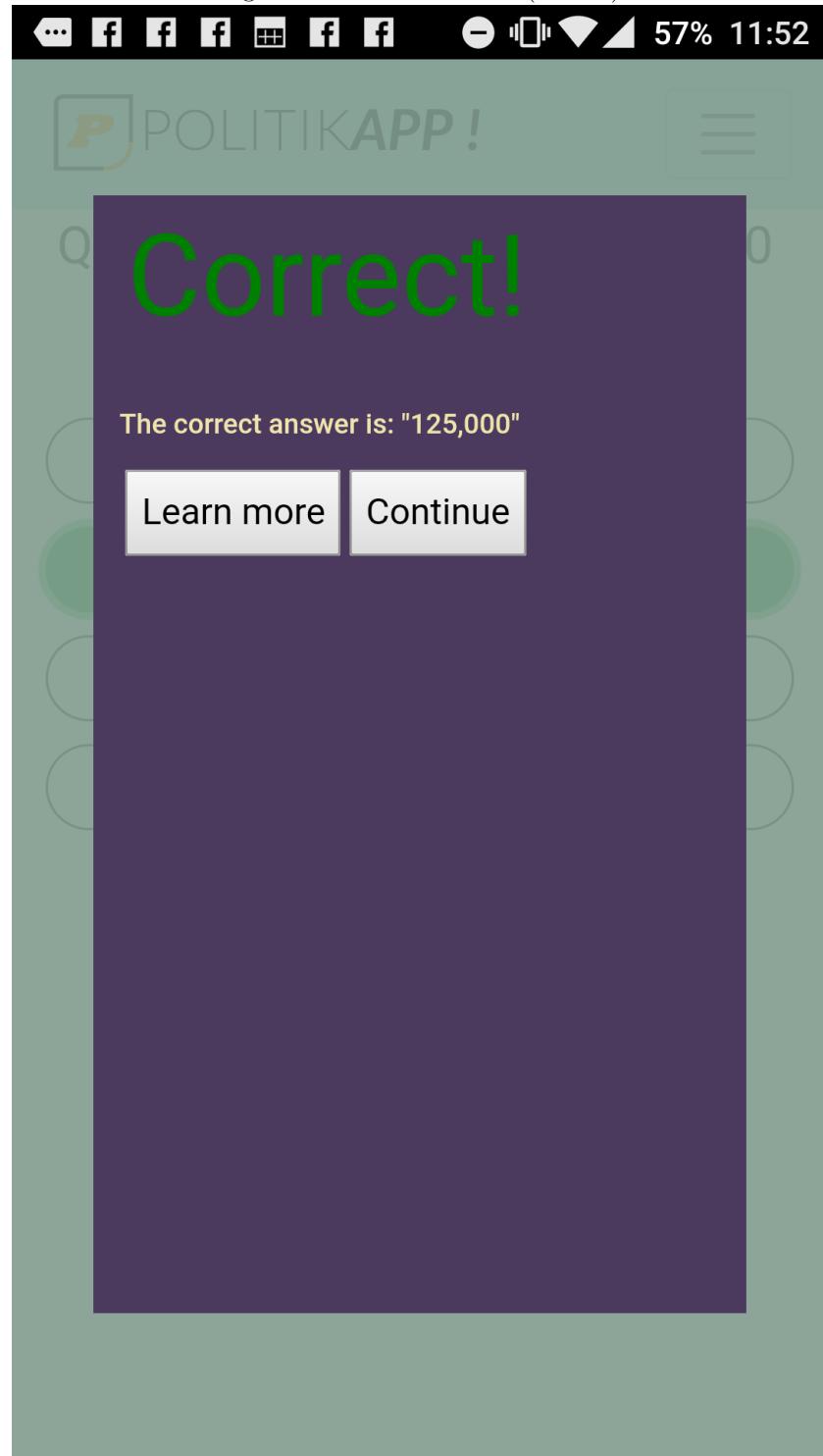


Figure 23: Answer selection (mobile)

