



StudyAbroad Acceptance Test Plan

Version 1.1

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Revision History

Date	Version	Description	Author
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2013-01-14	1.10	Additional test cases added	JH, DR

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1. Introduction

1.1 Purpose of this document

The purpose of this document is to define how the StudyAbroad application will be tested. Testing the requirements is made during the work on the application and before the final delivery to the client. This document can be changed during the testing period, but it has to be frozen once the product is delivered.

1.2 Intended Audience

This document is intended to:

- StudyAbroad developing team
- Project Supervisor

1.3 Scope

This document contains all the information needed to successfully test (and re-test) StudyAbroad application. All tests were done in a way that they can be re-run and should always give the same result. The tests described in this document cover all major parts of the application responsible for the correct execution of the program.

1.4 Definitions and acronyms

1.4.1 Definitions

Keyword	Definitions
Visual Studio	An integrated development environment (IDE) from Microsoft
SQL Server	A relational database management system developed by Microsoft.
Unit test	A method by which individual units of source code, sets of one or more computer program modules together with associated control data, usage procedures, and operating procedures, are tested to determine if they are fit for use

1.4.2 Acronyms and abbreviations

Acronym or abbreviation	Definitions
MS	Microsoft
DAL	Data access layer
ORM	Object-relational mapping
CRUD	Create, read, update and delete
UC	Use case
DB	Database
DLL	Dynamic Loading Layer

1.5 References

- <http://www.fer.unizg.hr/rasip/dsd/projects/studyabroad> - StudyAbroad project homepage
- <http://studyabroad.zapto.org/> - StudyAbroad application

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2. Test-plan introduction

To test the application we will use the unit testing framework included in the Visual Studio development environment. Every test class will try to cover the whole unit responsible for one action. Therefore, we do not test the whole layer once but we divide it into smaller logical units. For example: every entity that communicates with an external system will be tested separately.

Tests will cover all the main parts of the system, but not the whole data set. Because of the specific application and a large number of data entities it is not possible to test all the data sets. We will surely approach systematically to data testing, and we will try to cover as much of the data as possible. It is not realistic to expect that we will be able to test all the data, but we will definitely try to cover all characteristic data and some special cases. Considering that we cannot affect the external systems, we will test the robustness of our application according to errors in the data that come from external data sources.

We will also test usability and performance of the application using special cases and real customers. The application will be given to real users, and after that we will examine their opinion.

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3. Test items

There are four main components in our application that have to be tested:

- Data Access Layer which is responsible for manipulating with data from database and external sources
- Dynamic Loading Layer which is responsible for gathering data from external sources
- Business Logic Layer which is responsible for providing the server side interface towards the client and contains server side business logic
- Presentation Layer – client side of the application

All of these components will be divided into separate units, which will be tested with unit tests.

3.1 Data Access Layer

The Data Access component queries information from either the database or from repositories returned by the Dynamic Loader component and offers it to the other parts of the application. Other components don't need to know where the information is coming from, as they are using them in the same way through the Data Access interface.

Units to be tested:

- Database – connection, CRUD methods - (*DBTest*)
- ORM – mapping the classes - (*ORMTest*)
- ODSM – gathering data from DLL - (*ODSMTTest*)

3.2 Dynamic Loading Layer

Dynamic Loader component retrieves information from external open data sources and presents it to the Data Access Layer packaged inside of domain model objects.

Units to be tested:

- 4IcuLoader – data parsed from <http://www.4icu.org/> website - (*IcuTest*)
- FreebaseCityLoader – information about cities gathered from Freebase - (*FreebaseCityTest*)
- FreebaseUniversityLoader – information about universities gathered from Freebase (*FreebaseUniTest*)
- NumbeoLoader – information about cost of life - (*NumbeoTest*)
- DataBankClimateLoader - information about climate - (*ClimateTest*)

3.3 Business Logic Layer

The Business Logic component contains all the classes and methods which constitute the server side interface endpoint towards the client.

Units to be tested:

- LocationBusinessLogic – methods of manipulating with Location type classes - (*LocBTest*)
- CityBusinessLogic – additional methods to update information about cities - (*CityBTest*)
- CountryBusinessLogic – additional methods for country manipulation – (*CountryBTest*)
- RegionBusinessLogic - additional methods for region manipulation – (*RegionBTest*)
- ContinentBusinessLogic - additional methods for region manipulation – (*ContBTest*)
- CostOfLife – cost of life algorithm – (*CostTest*)
- ClimateClassification – climate classification algorithm - (*ClimateClassTest*)
- ReviewBusinessLogic - review infrastructure - (*ReviewBTest*)
- SearchEngineBusinessLogic – search infrastructure – (*SearchBTest*)
- UniversityBusinessLogic - additional methods to update information about universities – (*UniBTest*)
- UserBusinessLogic – methods for manipulation with user profiles – (*UserBTest*)
- SuggestionSystem – system that suggests universities based on questions – (*SuggSysTest*)

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- RecommendationSystem – system that recommends universities - (*RecSysTest*)

3.4 Presentation Layer

Presentational component retrieves the data from the server through the client – server interface and presents it on the user interface.

Units to be tested:

- Explore page – location, abstract information, top universities - (*TCEXPL01-P, TCEXPL04-P*)
- Search – cities, universities – (*TCSER01-P*)
- University Details page – information about university – (*TCEXPL03-P*)
- City Details page – information about city, images – (*TCREV01-P, TCREV08-P, TCGPLC03-P*)
- Log In page – (*TCREG01-P,TCREG01-N*)
- Registration page – (*TCREG02-N,TCREG02-P*)
- Log Out – (*TCREG03-P*)
- User Profile page – (*TCPRO01-P,TCPRO02-P,TCPRO03-P,TCPRO04-P,TCPRO05-P*)
- Suggestion page – (*TCNAV01-P, TCNAV11-P*)
- Recommendation page – (*TCNAV01-P, TCNAV11-P*)

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4. Features to be tested

All features described in Project Requirements document will be covered by tests. Some requirements will be tested on a number of levels. For example: information about the city will be checked after fetching from the database and also after displaying to the user. Of course, besides these feature tests there will be tests that cover internal methods which do not belong to the functionality of particular feature but are important for the proper execution of the program.

According to Project Requirements document:

- *It will be covered in the next tests*

4.1.1 Functional requirements (high priority)

- Viewing selected university information (basic) (UC3)
Tests: LocBTest, UniBTest, TCEXPL03-P, IcuTest, FreebaseUniTest, TCEXPL01-P, TCEXPL04-P
- Viewing selected city information (basic) (UC4)
Test: FreebaseCityTest, LocBTest, CityBTest, TCEXPL01-P, TCEXPL04-P, TCREV01-P, TCREV08-P
- Explore interactive map (UC1)
Tests: TCEXPL01-P, TCEXPL04-P
- Getting university suggestions (UC2)
Tests: SuggSysTest, TCNAV01-P, TCNAV11-P

4.1.2 Functional requirements (medium priority)

- Direct university search (UC15)
Tests: SearchBTest, TC SER01-P
- Viewing selected university information (advanced) (UC17)
Tests: LocBTest, UniBTest, TCEXPL03-P, IcuTest, FreebaseUniTest
- Viewing selected location information (advanced) (UC18)
Test: FreebaseCityTest, NumbeoTest, ClimateTest, LocBTest, CityBTest, TCREV01-P, TCREV08-P
- User registration (UC5)
Test: UserBTest, TC REG02-N, TC REG02-P, DBTest
- User log in (UC6)
Test: UserBTest, TC REG01-P, TC REG01-N
- User log out (UC7)
Test: UserBTest, TC REG03-P
- Viewing user's profile and preferences (UC8)
Test: UserBTest, TC PRO01-P, TC PRO02-P, TC PRO03-P, TC PRO04-P, TC PRO05-P
- Editing user's profile and preferences (UC9)
Test: UserBTest, TC PRO01-P, TC PRO02-P, TC PRO03-P, TC PRO04-P, TC PRO05-P, DBTest
- Viewing university recommendations (UC16)
Test: RecSysTest, TC NAV01-P, TC NAV11-P

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4.1.3 Functional requirements (low priority)

- Delete user's account (UC10)
Test: UserBTest, DBTest
- Commenting university (UC11)
Tests: DBTest, ReviewBTest, TCEXPL03-P
- Commenting city (UC12)
Tests: DBTest, ReviewBTest, TCREV01-P, TCREV08-P
- Rating university (UC13)
Tests: ReviewBTest, DBTest, TCEXPL03-P
- Rating city (UC14)
Tests: DBTest, ReviewBTest, TCREV01-P, TCREV08-P
- Delete user's comments (UC19)
Tests: DBTest, ReviewBTest, TCEXPL03-P
- Modify user's comments (UC20)
Tests: DBTest, ReviewBTest, TCEXPL03-P
- Delete/Modify user's account (UC21)
Test: UserBTest, TCPRO01-P, TCPRO02-P, TCPRO03-P, TCPRO04-P, TCPRO05-P, DBTest

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5. Features not to be tested

Units with static content will not be tested. Also, information holder type classes will not be tested. Features will not be tested over the whole data set, but only on a few elements.

Not testing:

- Home page - static content
- About Us page – static content
- Domain Model classes – information holders
- Enumerator classes - information holders
- Other information holder classes

6. Approach

Testing approach can be divided into two parts: testing during programming and testing after programming.

Each team member has to test his part of a program during programming. This test verifies the functionality of the program on small amount of data. In this part of testing most of the bugs will be found. Furthermore, because of coupling, the whole program is tested in this way, so it's a very effective method to find most of the errors and bugs.

Testing after programming usually means writing a group of unit tests for every part (layer) of the program. Each team member is responsible to write unit tests for their code. Tests can be re-run so everybody can test the part of application that has changed.

Server side and client side will be tested in different ways. Server program is going to be covered with unit tests, while testing of the client side means testing graphical interface.

Unit tests will be written and run by team members, while graphical interface is going to be tested by external person or a real customer and team members. Consequently, client side testing by real customers will not be easily repeatable.

6.1 Approach to configuration and installation

StudyAbroad system is an Internet application, so customers do not need any installation on their computer. Only thing they need is a web browser. Of course, this refers to the client side of the StudyAbroad application, while server side testing is a bit more complicated.

For server side testing it is necessary to have the following programs installed and configured:

- MS VisualStudio 2012
- MS SQLServer 2008

Furthermore it is necessary to have previously setup and initialized the database properly connected with the program.

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7. Item pass/fail criteria

A unit tests have very simple criteria for a pass or fail. Every unit test checks one feature or method and if all tests pass unit is correct. Also, every unit test has to return the same result no matter how many times it is re-run.

Information presented on the client side (graphical interface) should be correct and complete. Web sites should be robust and not crash during contingency operations.

Usability testing is subjective and does not have pass/fail criteria. However, if more than half of surveyed users give a positive rating about the site it will be considered as a pass.

7.1 Installation and Configuration

- If the web browser is not properly installed there can be problems with web site.
- If web server is not available or it is not configured properly application won't work.
- If database is not initialized and connected to application it won't work.
- MS Visual Studio is necessary for server side testing
- External data sources have to be online in order for the application to work

7.2 Documentation problems

All tests must be in accordance with written documents (official or internal). All the cases described in the Requirements document must be tested and must pass the tests. All doubts should be resolved in accordance with the Requirements document. If there is a case or concern that is not described in the requirements document, it is necessary to describe it and add it to the document.

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8. Suspension criteria and resumption requirements

If a bug is found in the lower layers of the application, there is an increased possibility that the result of other tests will be unexpected so it is advisable to stop testing that test group. If a bug is found in the user interface it is logged and testing can be continued. After the bug is resolved, failed tests and all affected tests need to be performed once again.

9. Environmental needs

After the application is uploaded to a server, there are no special environmental needs for application access, all that is required is that the device on which testing is performed has an internet connection. Application will be tested only on the most popular browsers, such as Google Chrome, Mozilla Firefox, Internet Explorer and Safari.

10. Test procedure

10.1 Test case specifications

10.1.1 Tests Cases for User Registration and Log-In/Log-Out - REG

10.1.1.1 Log In

Test Case ID	TCREG01-P
Description	Authenticate guest user
Test Type	Positive
Participating actors	User (registered)
Preconditions	The user has been previously registered. The user cannot be logged in.
Input definition	The guest user is at any page of the application. <ol style="list-style-type: none"> 1. The user clicks the Log In link. 2. The authentication page is displayed. 3. The user provides its credentials (username and password). 4. The user submits its credentials. 5. The user is redirected back to the page where the log in link was pressed.
Output definition	The user is logged in and its username is displayed in the top right corner.
Remarks	

Test Case ID	TCREG01-N
Description	Authenticate guest user
Test Type	Negative
Participating actors	User (registered)
Preconditions	The user has been previously registered. The user cannot be logged in.
Input definition	The guest user is at any page of the application. <ol style="list-style-type: none"> 1. The user clicks the Log In link. 2. The authentication page is displayed. 3. The user provides its credentials (username and password). 4. The user submits its credentials. 5. The system notifies the user that the credentials are not valid or that there is an error on the authentication process.
Output definition	The system displays the error message on the authentication page.
Remarks	

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10.1.1.2 Register

Test Case ID	TCREG02-P
Description	Creates a named account to be used in the system.
Test Type	Positive
Participating actors	User (unregistered)
Preconditions	The user cannot be logged in.
Input definition	The unregistered user is at any page of the application. <ol style="list-style-type: none"> 1. The user clicks the Register link. 2. The registration page is displayed. 3. The user provides the required data, specially username and password. 4. The user submits the requested data. 5. The system displays a successful registration message. The unregistered user is now registered under the User role.
Output definition	The user is not logged in.
Remarks	

Test Case ID	TCREG02-N
Description	Creates a named account to be used in the system.
Test Type	Negative
Participating actors	User (unregistered)
Preconditions	The user cannot be logged in.
Input definition	The guest user is at any page of the application. <ol style="list-style-type: none"> 1. The user clicks the Register link. 2. The registration page is displayed. 3. The user provides the required data; especially a username is already registered. 4. The user submits the requested data. 5. The system notifies the user that the data provided is not valid or duplicate.
Output definition	The system displays the error message and remains on the registration page.
Remarks	

10.1.2 Log Out

Test Case ID	TCREG03-P
Description	Exit the user from the web application
Test Type	Positive
Participating actors	User (registered)
Preconditions	The user has been previously registered. The user must be logged in.
Input definition	The user is at any page of the application. <ol style="list-style-type: none"> 1. The user clicks the Log out link. 2. The system kills the user session and the authentication cookie. 3. The user is redirected back to the home page.
Output definition	The user is logged out and its username is not displayed in the top right corner.
Remarks	

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10.1.3 Tests Cases for Direct Search - SER

Test Case ID	TCSER01-P
Description	Search for a city or university
Test Type	Positive
Participating actors	User (unregistered, registered)
Preconditions	None
Input definition	The user is at any page of the application. <ol style="list-style-type: none"> 1. The user fills the search field at the top right of any page. 2. The user clicks the search button. 3. The system displays a search results page listing all universities and cities that match the string introduced on the search field.
Output definition	User is redirected to search results page.
Remarks	

10.1.4 Test Cases for User Profile - PRO

Test Case ID	TCPRO01-P
Description	View user profile and preferences
Test Type	Positive
Participating actors	User (registered)
Preconditions	User must be logged in.
Input definition	The user is at any page of the application. <ol style="list-style-type: none"> 1. The user clicks the Preferences link at the top right of any page. 2. The system displays a page with the user personal data.
Output definition	User is redirected to his personal page.
Remarks	

Test Case ID	TCPRO02-P
Description	Edit user profile and preferences
Test Type	Positive
Participating actors	User (registered)
Preconditions	User must be logged in and on his personal page.
Input definition	<ol style="list-style-type: none"> 1. The user modifies/changes any data. 2. The user clicks the update button. 3. The page is updated with the changes and a successful message is displayed.
Output definition	The personal page is updated with the changes.
Remarks	

Test Case ID	TCPRO03-P
Description	Delete user
Test Type	Positive
Participating actors	User (registered)
Preconditions	User must be logged in and on his personal page.
Input definition	<ol style="list-style-type: none"> 1. The user clicks the "remove user" button. 2. A confirmation dialog is displayed. 3. The user confirms the removal action. 4. The user is removed from the system. 5. The user is redirected to the home page as an unregistered user.

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Output definition	The user is removed from the system.
Remarks	

Test Case ID	TCPRO04-P
Description	Delete user
Test Type	Positive
Participating actors	Admin
Preconditions	Admin must be logged in.
Input definition	<ol style="list-style-type: none"> 1. The Admin goes to the user management page via the Manage link under the header. 2. A list with all the users is displayed. 3. The Admin clicks the “delete” button next to the user who want to remove. 4. A confirmation dialog is displayed. 5. The Admin confirms the removal action. 6. The user is deleted and the user list is updated.
Output definition	The user is removed from the system.
Remarks	

Test Case ID	TCPRO05-P
Description	Modify user
Test Type	Positive
Participating actors	Admin
Preconditions	Admin must be logged in.
Input definition	<ol style="list-style-type: none"> 1. The Admin goes to the user management page via the Manage link under the header. 2. A list with all the users is displayed. 3. The Admin clicks the “modify” button next to the user who want to remove. 4. The Admin is redirected to the user’s preference page. 5. The Admin modifies any preference from the user.
Output definition	The user personal page is updated with the changes.
Remarks	

10.1.5 Test Cases for Reviewing Cities and Universities(includes commenting and rating) - REV

Test Case ID	TCREV01-P
Description	Add university comment
Test Type	Positive
Participating actors	User (registered)
Preconditions	User must be logged in and on a university page.
Input definition	<ol style="list-style-type: none"> 1. The user writes his comment on the comment placeholder. 2. The user submits the comment by clicking a button. 3. The comment is stored in the database and updated on the university page.
Output definition	The university page is updated with the new comment.
Remarks	

Test Case ID	TCREV02-P
Description	Remove university comment
Test Type	Positive
Participating actors	User (registered), Admin
Preconditions	User/Admin must be logged in and on a university page.
Input definition	<ol style="list-style-type: none"> 1. The user clicks on the remove button near the review made. 2. A confirmation dialog is displayed.

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	3. The user confirms the removal action. 4. The comment is deleted and the page is updated accordingly.
Output definition	The university page is updated without the deleted comment.
Remarks	

Test Case ID	TCREV03-P
Description	Modify university comment
Test Type	Positive
Participating actors	User (registered), Admin
Preconditions	User/Admin must be logged in and on a university page.
Input definition	1. The user clicks on the modify button near the review made. 2. The comment placeholder becomes editable. 3. The user confirms the change by clicking a button. 4. The review is modified and the page is updated accordingly.
Output definition	The university page is updated with the updated comment.
Remarks	

Test Case ID	TCREV04-P
Description	Add city comment
Test Type	Positive
Participating actors	User (registered)
Preconditions	User must be logged in and on a city page.
Input definition	1. The user writes his comment on the comment placeholder. 2. The user submits the comment by clicking a button. 3. The comment is stored in the database and updated on the city page.
Output definition	The city page is updated with the new comment.
Remarks	

Test Case ID	TCREV05-P
Description	Remove city comment
Test Type	Positive
Participating actors	User (registered), Admin
Preconditions	User/Admin must be logged in and on a city page.
Input definition	1. The user clicks on the remove button near the review made. 2. A confirmation dialog is displayed. 3. The user confirms the removal action. 4. The comment is deleted and the page is updated accordingly.
Output definition	The city page is updated without the deleted comment.
Remarks	

Test Case ID	TCREV06-P
Description	Modify city comment
Test Type	Positive
Participating actors	User (registered), Admin
Preconditions	User/Admin must be logged in and on a city page.
Input definition	1. The user clicks on the modify button near the review made. 2. The comment placeholder becomes editable. 3. The user confirms the change by clicking a button. 4. The review is modified and the page is updated accordingly.
Output definition	The city page is updated with the updated comment.
Remarks	

Test Case ID	TCREV07-P
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Description	Add university rating
Test Type	Positive
Participating actors	User (registered)
Preconditions	User must be logged in and on a university page.
Input definition	<ol style="list-style-type: none"> 1. The user assigns the rating choice from the rating panel. 2. The rating is automatically stored in the database and updated on the university page.
Output definition	The university rating is updated.
Remarks	

Test Case ID	TCREV08-P
Description	Add city rating
Test Type	Positive
Participating actors	User (registered)
Preconditions	User must be logged in and on a city page.
Input definition	<ol style="list-style-type: none"> 1. The user assigns the rating choice from the rating panel. 2. The rating is automatically stored in the database and updated on the city page.
Output definition	The city rating is updated.
Remarks	

10.1.6 Test Cases for Navigation and Suggestion - NAV

Test Case ID	TCNAV01-P
Description	User navigate to suggestion page
Test Type	Positive
Participating actors	User (registered or unregistered)
Preconditions	None (user can be on every page)
Input definition	<ol style="list-style-type: none"> 1. He clicks on suggestion button on the navigation bar.
Output definition	User is redirected to suggestion page.
Remarks	If the user is already on the suggestion page, the page is simply reloaded.

Test Case ID	TCNAV02-P
Description	User navigate to exploration page
Test Type	Positive
Participating actors	User (registered or unregistered)
Preconditions	None (user can be on every page)
Input definition	<ol style="list-style-type: none"> 1. He clicks on explore button on the navigational bar
Output definition	User is redirected to exploration page.
Remarks	If the user is already on the exploration page, the page is simply reloaded.

Test Case ID	TCNAV03-P
Description	User navigate to main page
Test Type	Positive
Participating actors	User (registered or unregistered)
Preconditions	None (user can be on every page)
Input definition	<ol style="list-style-type: none"> 1. He clicks on the logo into the header.
Output definition	User is redirected to main page.
Remarks	If the user is already on the main page, the page is simply reloaded.

Test Case ID	TCNAV04-P
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Description	User navigate to about page
Test Type	Positive
Participating actors	User (registered or unregistered)
Preconditions	None (user can be on every page)
Input definition	1. He clicks on about button on the navigational bar.
Output definition	User is redirected to about page.
Remarks	If the user is already on the about page, the page is simply reloaded.

Test Case ID	TCNAV05-P
Description	User want to see one of the top universities reported into the page
Test Type	Positive
Participating actors	User (registered or unregistered)
Preconditions	User has to be on the main page.
Input definition	1. He clicks on one of the university names present into the "Top university" section (E.G. Stanford university).
Output definition	User is redirected to the related university page (E.G. on the Stanford University page.
Remarks	This test should be repeated sometimes with different universities. It's important to try also with universities that present non-English name (E.G. Universitat Wien).

Test Case ID	TCNAV06-P
Description	User insert his preference in order to get suggestions
Test Type	Positive
Participating actors	User (registered or unregistered)
Preconditions	User has to be on the suggestion page.
Input definition	Note: the question sequence is dynamically loaded so the following flow is just a possible situation: <ol style="list-style-type: none"> 1. User selects "Europe" and presses Next 2. User selects "Southern Europe" and presses Next 3. User selects "Bachelor Degree" and presses Next 4. User selects "Engineering" and presses Next 5. User selects "Cheap" and presses Next
Output definition	<ol style="list-style-type: none"> 1. Page is updated displaying 3 possible universities (in Spain) 2. Map is updated displaying only Spain with a colour, on mouse over tooltip is displayed "Spain, Universities:3" 3. History is updated showing the five questions asked (with the answer inserted by the user)
Remarks	

Test Case ID	TCNAV07-N
Description	The preferences inserted by the user lead no university
Test Type	Negative
Participating actors	User (registered or unregistered)
Preconditions	User has to be on the suggestion page
Input definition	Note: the question sequence is dynamically loaded so the following flow is just a possible situation: <ol style="list-style-type: none"> 1. User selects "Africa" and presses Next 2. User selects "Northern Africa" and presses Next 3. User selects "Certificate or Diplomas" and presses Next 4. User selects "Arts and Humanities" and presses Next

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	5. User selects “very Cheap” and presses Next
Output definition	<ol style="list-style-type: none"> 1. A warning message that no universities have been found is displayed on the screen 2. Map is updated displaying all the world without color 3. History is updated showing the five questions asked (with the answer inserted by the user).
Remarks	

Test Case ID	TCNAV08-P
Description	The preferences inserted by the user lead to more than 10 universities
Test Type	Positive
Participating actors	User (registered or unregistered)
Preconditions	User has to be on the suggestion page.
Input definition	<p>Note: the question sequence is dynamically loaded so the following flow is just a possible situation:</p> <ol style="list-style-type: none"> 1. User selects “Americas” and presses Next 2. User selects “Northern America” and presses Next 3. User selects “Bachelor Degree” and presses Next 4. User selects “Arts and Humanities” and presses Next 5. User selects “Very Expansive” and presses Next 6. User selects “Continental” and presses Next
Output definition	<ol style="list-style-type: none"> 1. A warning message that many universities are found is displayed 2. Map is updated displaying the countries in which the universities are located (USA and Canada) 3. Top 10 ranked universities are shown (9 USA and 1 Canada) 4. History is updated showing the six questions asked (with the answer inserted by the user).
Remarks	

Test Case ID	TCNAV09-P
Description	The user hit back button on a question
Test Type	Positive
Participating actors	User (registered or unregistered)
Preconditions	User has to be on the suggestion page. A question different from the first one must be on the screen.
Input definition	<ol style="list-style-type: none"> 1. User hits back button
Output definition	<ol style="list-style-type: none"> 1. History is updated removing the last question from the list. 2. Previous question is displayed. 3. Map is updated to the previous question state.
Remarks	

Test Case ID	TCNAV10-P
Description	User hit next button on a question
Test Type	Positive
Participating actors	User (registered or unregistered)
Preconditions	User has to be on the suggestion page. A question must be on the screen. Answering the question doesn't lead to a terminating state (see WA -7 WA-8 WA-6).

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Input definition	1. User selects an answer and hits next button
Output definition	1. History is updated adding the new answered question. 2. Next question is displayed. 3. Map is updated displaying the actual state of the suggestion.
Remarks	

Test Case ID	TCNAV11-P
Description	User want to know the suggestion process functioning
Test Type	Positive
Participating actors	User (registered or unregistered)
Preconditions	User has to be on the suggestion page
Input definition	1. He clicks on question button
Output definition	A popup appears with explanation of the functioning of our system.
Remarks	

Test Case ID	TCNAV12-P
Description	User navigates to the city details' page
Test Type	Positive
Participating actors	User (registered or unregistered)
Preconditions	User has to be on the exploration page at country level or on a university page.
Input definition	1. He clicks on the city name or on the "More details..." link to the city page
Output definition	User is redirected to the related city page (E.G. on the Zagreb city page.
Remarks	This test should be repeated sometimes with different cities. It's important to try also with cities in the USA, to check for inconsistencies with cities from the rest of the world.

10.1.7 Test Cases for Free Exploration – EXPL

10.1.7.1 World View

Test Case ID	TCEXPL01-P
Description	View a world map with a list of the top universities worldwide
Test Type	Positive
Participating actors	User
Preconditions	None
Input definition	1. The user starts the exploration functionality from any page 2. The user waits for the loading of the page and of the information to complete
Output definition	A styled map of the world is shown. On the left of the page a list of the top 5 universities in the world is shown
Remarks	

10.1.7.2 Region View

Test Case ID	TCEXPL02-P
Description	View a map of a specific region in the world with a list of the top universities in that region

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Test Type	Positive
Participating actors	User
Preconditions	The user has started the exploration functionality and is seeing the interactive map; he may be at world, continent or region level. The loading of the universities' list may still be incomplete
Input definition	<ol style="list-style-type: none"> 1. The user clicks on a specific region in the map 2. The user waits for the loading of the information to complete
Output definition	A styled map of the selected region is shown. On the left of the page a list of the top 5 universities in that region is shown
Remarks	<ul style="list-style-type: none"> - If the chosen region is a country different from "United States of America" or a US state (e.g. "Texas") the output will have additionally a list of markers drawn on the map itself; each marker represents a city in that country and its size is related to the number of universities in that city - If the chosen region is the country "United States of America" the top universities list is not be displayed and the user is invited to choose a US state

10.1.7.3 City View

Test Case ID	<i>TCEXPLO3-P</i>
Description	View an abstract of a specific city selected by the user
Test Type	Positive
Participating actors	User
Preconditions	The user has started the exploration functionality and is seeing the interactive map at a country level, if the country is not "USA", or at a US state level; The loading of the universities' list and of the city markers may still be incomplete
Input definition	<ol style="list-style-type: none"> 1. The user clicks on one marker on the map
Output definition	A box in the top right of the page appears reporting the name of the city selected and a very short description along with a clickable link that brings to the full page of the city. The top universities list is updated with the top 5 of that city.
Remarks	<ul style="list-style-type: none"> - Some less popular cities in the world may not have the abstract - If in the chosen city there are less than 5 universities the related list will be shorter

10.1.7.4 University View

Test Case ID	TCEXPLO4-P
Description	View an abstract of a specific university
Test Type	Positive
Participating actors	User
Preconditions	The user has started the exploration functionality and is seeing the interactive map at any level. The list of top universities is ready.
Input definition	<ol style="list-style-type: none"> 1. The user moves the mouse cursor over the name of one university
Output definition	The list expands and more information are shown. These info are a short description, the global rank and a clickable link that brings to the full page of the university.
Remarks	<ul style="list-style-type: none"> - Some less popular universities may not have the description

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10.1.8 Test Cases for Google Places Interaction – GPLC

10.1.8.1 Start the Google Places functionality

Test Case ID	TCGPLC01-P
Description	Open the interactive map where the user can search for interesting places
Test Type	Positive
Participating actors	User
Preconditions	The user is in a university or in a city page.
Input definition	1. The user clicks on the “University Life” / “City Life” tab
Output definition	A new tab is opened where the Google map is loaded, centered on the university address or on the city center. Above the map there is a list of categories for the places.
Remarks	

10.1.8.2 Unresolved address

Test Case ID	TCGPLC01-N
Description	The user opens the “Life” tab for a university or a city but Google can’t resolve the corresponding address.
Test Type	Negative
Participating actors	User
Preconditions	The user is in a university or in a city page.
Input definition	1. The user clicks on the “University Life” / “City Life” tab
Output definition	A new tab is opened where an error message is displayed saying that there was an error geocoding the address.
Remarks	

10.1.8.3 Toggling categories

Test Case ID	TCGPLC02-P
Description	The user toggles a category of places to display on the map.
Test Type	Positive
Participating actors	User
Preconditions	The user is in a university or in a city Life page and the map has loaded correctly.
Input definition	1. The user clicks arbitrarily on any category button above the map.
Output definition	<ul style="list-style-type: none"> - If the chosen category is enabled for the first time in the current page the number of found places is printed next to the clicked category name and the map is populated with styled markers representing each place found - If the chosen category was already shown on the map the corresponding markers are hidden on the map - If the chosen category was already enabled but hidden on the map the corresponding markers are shown again
Remarks	

10.1.8.4 Place details

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Test Case ID	TCGPLC03-P
Description	Details about a specific place are shown
Test Type	Positive
Participating actors	User
Preconditions	The user is in a university or in a city Life page and the map has loaded correctly and is populated with some markers.
Input definition	1. The user clicks arbitrarily on one marker of the map.
Output definition	- All the details for the place available from Google Places are displayed below the map
Remarks	

10.2 Test plan

The test cases are divided according to functional units. Team members who did not implement those functionalities will run them and submit the results in order to generate the test report.

Additionally server side developers are unit testing business and data access layer objects.

11. Responsibilities

11.1 Developers

- Unit testing
- Fixing server side bugs
- Fixing client side bugs

11.2 User representative

System will be tested by the team members who will pose as users, and by actual real users. Team users will test the system according to defined test scenarios and all noticed bugs will be noted in the task monitoring system that we are using. After one of the bugs is corrected, users will test if it is done correctly.

Real users will not test the system according to a defined test scenarios, but will use and explore all of the systems functionalities. They will inform our team with all noticed bugs, and will be questioned about user experience of our system, and whether they have some objections and propositions for improvement.

12. Risks and contingencies

The primary risk in testing is that a major bug will not be found, and that found bugs will not be corrected in determined time. Another problem is that the application cannot be tested in all browsers and all versions of browsers so there is a risk that some parts will not look and work as intended in some browsers.

We will try to reduce the risk of not finding bugs with good priority test definitions, and risk of not corrected bugs in determined time will be reduced by earlier testing. We will reduce the number of inappropriate browsers by testing the application in many different browsers.

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13. Approvals

Name	Title	Date yyyy-mm-dd	Signature
Branimir Lochert	Project Leader		
Alessandro Sisto	Team Leader		
Ivana Bosnić	Supervisor		