Semestral project

B(E)4M36ZKS - Zajištění kvality software / Software Quality Assurance

Jaroslav Erben

Description of the SUT

Chosen application DeoApp was developed with the purpose of helping with the digitalization of the History Olympiad. System provides organizers a digital workflow of preparing, running and evaluating every new year of the contest. Students can register via given Guarantees. Test Creators can create tests in advance with a semi-shared workspace. Tests can be open at a given time to contestants with activated codes. Finally evaluation is automated as much as possible given the nature of each question type.

This application was chosen for this project because I have access to source-code, the system offers plenty of user interfaces suited for front-end tests. Another reason was to get resume development of given application.

Link to repository: https://github.com/erbenja/deoapp

Boundary Values and Equivalence Classes Analysis

Create New Contestant

OlympiadYear [string]

Equivalence Class	**Validity**
empty	Technically Invalid
not existing	Technically Invalid
closed registration	Business Invalid
valid	Valid

boundary values: [‘’, ‘OYnotExisting’, ‘OYtestingCLOSED’, ‘OYtestingOPENED’]

Firstname [string]

Equivalence Class	**Validity**
empty	Business Invalid
numbers in string	Business Invalid
alphabet only	Valid

boundary values: [‘’, P3t3r, Adam]

Email [string]

Equivalence Class	Validity
empty	Business Invalid
not email format	Technically Invalid
email format	Valid

boundary values: [‘’, email.cz, adam@email.cz]

BirthDate [date]

Equivalence Class	Validity
empty	Technically Invalid
not date	Technically Invalid
incompatible date format	Technically Invalid
date format [YYYY-MM-DD]	Valid

boundary values: [‘’, ‘hello’, ‘1st of March’, ‘2002-02-01’’]

ClassNum [number]

Equivalence Class	Validity
empty	Technically Invalid
not number	Technically Invalid
<8	Business Invalid
>13	Business Invalid
8-9	Valid
10-13	Valid

boundary values: [‘’, ‘test’, 7, 14, 8, 10’]

School [string]

Equivalence Class	Validity
empty	Technically Invalid
not existing	Technically Invalid
valid	Valid

boundary values: [‘’, ZS Postovni, Gymnazium Jana Palacha Praha 1,]

Create Question of Description type

MaxPoints [number]

Equivalence Class	**Validity**
empty	Technically Invalid
<=0	Business Invalid
>10	Business Invalid
[1-10]	Valid

boundary values: [‘’,0, 11, 10]

Description [string]

Equivalence Class	**Validity**
empty	Business Invalid
any string	Valid

boundary values: [‘’, Question?’]

Description Photo [file]

Equivalence Class	**Validity**
Non (jpg,jpeg,png,gif) file format	Technically Invalid
empty	Valid
(jpg,jpeg,png,gif) file format	Valid

boundary values: [‘.txt’,’’, ‘.jpg’’]

Create Olympiad Year

year[number]

Equivalence Class	**Validity**
empty	Technically Invalid
not number	Business Invalid
number	Valid

boundary values: [‘’,’DvaTisice’, 2022]

Name [string]

Equivalence Class	Validity
empty	Business Invalid
any string	Valid

boundary values: [‘’, ‘Name’’]

Description [string]

Equivalence Class	Validity
empty	Business Invalid
any string	Valid

boundary values: [‘’, ‘Name’’]

Open to Registration [boolean]

Equivalence Class	Validity
empty	Technically Invalid
checked	Valid
unchecked	Valid

boundary values: [‘’, true, false]

Registration Deadline [date]

Equivalence Class	Validity
empty	Technically Invalid
not date	Technically Invalid
incompatible date format	Technically Invalid
date format [YYYY-MM-DD]	Valid

boundary values: [‘’, ‘hello’, ‘1st of March’, ‘2050-02-01’’]

Input Data Combinations

Not all chosen inputs are suitable for Mixed-Stregth-Coverage. Only CreateNewContestant inputs have fields where defining any relation has meaning.

2-way: all inputs
3-way: all inputs
Mixes: CreateNewContestant - 3-way [OlympiadYear, ClassNum, School]

Process Testing

Graphs are in xml and svg format in /graphs. Due to size and complexity they are not included in this document because it would not be legible. In following parts are listed generated paths for both graphs;

Web Application

Model of navigating through web application.

TDL=1

START - Home - Home - Example test - Home - Enter code - Test - Home - About us - LOGIN - LOGIN - Administration - Administration - Contestants - New Contestant - Administration - Evaluations - Evaluate protocol - Administration - Results - View Result - Administration - Olympiad year - Edit olympiad year - Administration - Users - New user - Administration - Posts - New post - Administration - Tests - Edit test - Administration - END B
START - Home - Administration - Administration - END B
START - Home - Administration - Contestants - View Contestant - Administration - Olympiad year - New olympiadyear - Administration - Users - Edit user - Administration - Posts - Edit post - Administration - Administration - END B
START - Home - END A

TDL=2

START - Home - Example test - Home - Enter code - Test - Home - About us - Example test - Home - Home - LOGIN - Administration - Contestants - New Contestant - Administration - Evaluations - Evaluate protocol - Administration - Results - View Result - Administration - Olympiad year - Edit olympiad year - Administration - Users - New user - Administration - Posts - New post - Administration - Tests - Edit test - Administration - END B
START - Home - About us - About us - Enter code - Test - Home - Example test - Home - Administration - Administration - Contestants - View Contestant - Administration - Administration - END B
START - Home - About us - Home - Example test - Home - LOGIN - LOGIN - Administration - Contestants - New Contestant - Administration - Administration - END B
START - Home - About us - LOGIN - Administration - Contestants - New Contestant - Administration - Administration - END B
START - Home - Administration - Olympiad year - New olympiad year - Administration - Users - Edit user - Administration - Posts - Edit post - Administration - Contestants - New Contestant - Administration - Administration - END B
START - Home - END A
START - Home - About us - END A

TDL=3

is included in csv format in /graphs

Test Creating Process

Model of creating/editing single test.

TDL=1

START - END T
START - Delete question - Toggle option correct - Edit option text - Delete option - Add option - Delete desciption photo - Upload description photo - Edit points - Edit description - Add new question - Toggle Test Open/Close State - Edit Test Time - END T
START - Add option - END T

TDL=2

START - END
START - Edit Test Time - END T
START - Delete question - Toggle option correct - Edit option text - Delete option - Add option - Delete description photo - Upload description photo - Edit points - Edit description - Add new question - Toggle Test Open/Close State - Edit Test Time - Edit Test Time - END T
START - Toggle Test Open/Close State - END T
START - Add new question - END T
START - Edit description - END T
START - Edit points - END T
START - Upload description photo - END T
START - Delete description photo - END T
START - Add option - END T
START - Delete option - END T
START - Edit option text - END T
START - Toggle option correct - END T
START - Delete question - END T

TDL=3

is included in csv format in /graphs

Implemented tests

CI pipeline

Created Github Action where Frontend and Backend tests are run separately. Frontend tests run on a fresh database with testing data inserted. Pipeline is activated on each commit and pull request.

Front-end based tests

Combination of Screenplay pattern, parametrized and generic frontend tests;

Page Object pattern

Most of the interaction with the system during testing is done via PageObject pattern.

Screenplay pattern

Four tests were created testing different parts of the application.

Parameterized tests

Single parameterized test is run on a file containing negative as well positive data.