

PPALMS Test Procedures

Test Case [SETTINGS-01 through SETTINGS-11]

Purpose: Verify that the Settings class saves user configured values and can return the same values.

Owner: Testing Group

Expected Results: The given settings will be stored correctly and equal the same values when returned.

Test Data: testing.h, testing.cpp, and qti.txt

Test Tools: PPALMS.exe

Dependencies: Command to start testing is ./PPALMS test or ./PPALMS test settings.

Initialization: PPALMS is running and given "test" as an argument.

Description: Default constructor is initialized using an object. Getter functions tested using that object to ensure values stored equal the default values. Another Settings object initialized. Setter functions used to store values and Getter functions used to ensure values match the stored values.

Test Case	Command being tested
SETTINGS-01	Default Constructor – GetPath returns NULL
SETTINGS-02	Default Constructor – GetLMS returns NULL
SETTINGS-03	Default Constructor – GetType returns NULL
SETTINGS-04	Default Constructor – GetMutations returns 5
SETTINGS-05	Parameterized Constructor – GetPath returns the same value as the argument.
SETTINGS-06	Parameterized Constructor – GetLMS returns the same value as the argument.
SETTINGS-07	Parameterized Constructor – GetType returns the same value as the argument.
SETTINGS-08	Parameterized Constructor – GetMutations returns the same value as the argument.
SETTINGS-09	Parameterized Constructor – GetLines returns the same values as the argument.
SETTINGS-10	GetPath returns the same value set when using SetPath.
SETTINGS-11	GetLMS returns the same value set when using SetLMS.
SETTINGS-12	GetType returns the same value set when using SetType.
SETTINGS-13	GetMutations returns the same value set when using SetMutations.
SETTINGS-14	GetLines returns the same value set when using SetLines.

Test Case [BANK-01 through BANK-04]

Purpose: Verify that Question objects are correctly added to, exported from, and erased in QuestionBank objects using the AddQuestion, ExportQuestions, and EraseQuestions functions respectively. These tests do not validate information in Question objects and only verify that the functions within the QuestionBank class function as intended.

Owner: Testing Group

Expected Results: Vary by command. EraseQuestions should always clear the stored vector containing any questions added using AddQuestions. AddQuestions should append a given vector of Questions to the vector of Questions in the QuestionBank object. ExportQuestions should save all stored Questions from the vector into a file named "qti.txt" and return a 1 on success or a 0 otherwise. This function returns 0 when there are no questions to store, if a file could not be created, or if Questions contain incorrect information for saving (such as an invalid type of question or missing text).

Test Data: testing.h, testing.cpp, and qti.txt

Test Tools: PPALMS.exe

Dependencies: Command to start testing is ./PPALMS test or ./PPALMS test bank.

Initialization: PPALMS is running and given "test" as an argument.

Description: Default constructor is initialized using an object. An empty vector of Question objects and an empty Question object are created, along with an empty vector of vectors of strings for answer tuples and a vector of strings for a single answer tuple.

- ExportQuestions and EraseQuestions are tested on the empty questions vector.
- An empty Question vector is added to the vector using AddQuestions, then attempts to export.
- Adds a blank Question to the vector then adds that to the bank using AddQuestions, then attempts to export.
- Erases the saved questions then attempts to export.
- Adds a single question containing information to the QuestionBank then exports.
- Adds a second question then exports.

Test Case	Command being tested
BANK-01	ExportQuestions should return the error code 0 when attempting to export on an empty question bank.
BANK-02	EraseQuestions should not affect an empty question bank.
BANK-03	AddQuestions should not affect the question bank if the questions to be added are empty.
BANK-04	Adding a single Question to the bank should change its size to 1.
BANK-05	Erasing the single Question from the bank of size 1 should cause the size to change to 0.
BANK-06	A single question added to the bank should export successfully.
BANK-07	Adding and exporting 3 valid questions should be successful.

Test Case [GENERATOR-01 through GENERATOR-05]

Purpose: Verifies that the generator can generate “rearrange” questions correctly. The current version can only handle the rearrange question type and cannot handle other types of questions.

Owner: Testing Group

Expected Results: If the path is invalid, the question type is invalid, or the lines are 0, the function should return an empty vector of Question objects. The function should successfully generate the question whose type is “rearrange”, otherwise the function should return an empty vector of Question objects.

Test Data: testing.h, testing.cpp, and qti.txt

Test Tools: PPALMS.exe

Dependencies: Command to start testing is ./PPALMS test or ./PPALMS test generator

Initialization: PPALMS is running and given “test” as an argument.

Description: A Generator object is initialized along with a series of differing Settings objects. Each Settings object correlates with a different outcome and each is passed to the Generator object to produce and test each potential behavior of the Generator.

Test Case	Command being tested
GENERATOR-01	GenerateRearrange: settings.path == null
GENERATOR-02	GenerateRearrange: settings.type == null
GENERATOR-03	GenerateRearrange: settings.type != rearrange
GENERATOR-04	GenerateRearrange: given empty file
GENERATOR-05	GenerateRearrange: settings.type == rearrange

Test Case [GRABBER-01 through GRABBER-04]

Purpose: Verify that the LineGrabber class can be used to create LineGrabber objects, which allow opening files to retrieve specific line numbers (either single lines or tuples/sets of lines). Verifies that the functions within the class function as intended.

Owner: Testing Group

Expected Results: Lines will only be retrieved if the given line numbers do not go below 1 and do not exceed the maximum line number of the file. The file must also open correctly, as a path must be valid.

Test Data: testing.h, testing.cpp, and qti.txt

Test Tools: PPALMS.exe

Dependencies: Command to start testing is ./PPALMS test or ./PPALMS test grabber

Initialization: PPALMS is running and given "test" as an argument.

Description:

Test Case	Command being tested
GRABBER-01	GrabLines: file path is null. No lines grabbed.
GRABBER-02	GrabLines: valid file, empty vector of line numbers. No lines grabbed.
GRABBER-03	GrabLines: single-line values (-1 and 0) that are out of bounds. No lines grabbed.
GRABBER-04	GrabLines: tuple-line values (-1 to 1). Should only grab line 1.
GRABBER-05	GrabLines: single-line value (1) that is the first possible value. Grabs line 1.
GRABBER-06	Confirm that the grabbed line using the line number 1 is the same as the first line in the file.
GRABBER-07	GrabLines: single-line value (15) that is the last possible value. Grabs line 15.
GRABBER-08	GrabLines: single-line value (16) that is out of bounds. No lines grabbed.
GRABBER-09	GrabLines: two tuples (0-1) and (10-16) as line numbers. Grabs only lines 1, and 10-15 which are within bounds. Size of lines returned should be 2 tuples.
GRABBER-10	With GRABBER-08: First tuple should have size 1.
GRABBER-11	With GRABBER-08: Second tuple should have size 6.
GRABBER-12	With GRABBER-10: Grabbed lines should match the lines in the file.

Test Findings

Title	Test Case(s)	Findings
Add Questions to Bank	BANK-02	No issues: Question objects appended correctly.
Change Configuration of Settings	SETTINGS-07 to SETTINGS-11	No issues: new settings applied and saved in a Settings object.
Create Generator object(s)	GENERATE-01 to GENERATE-05	No issues.
Create LineGrabber object	GRABBER-01 to GRABBER-04	No issues.
Create QuestionBank object	BANK-01	No issues.
Create Settings object	SETTINGS-01, SETTINGS-02	No issues.
Erase Questions in Bank	BANK-04	No issues: vectors cleared successfully.
Export Questions from Bank	BANK-03	Questions were not exporting in the correct format. Changed to reflect QTI standards.
Files Open Correctly	GRABBER-02 to GRABBER-04	No issues: prints an error on failure.
Generated Questions	GENERATOR-01 to GENERATOR-05	No issues: questions generated successfully.
Grab Lines from File	GRABBER-02 to GRABBER-04	Missed a check for line values below 1.
Verify Settings Objects Hold Correct Values	SETTINGS-01 to SETTINGS-14	No issues: default constructor values matched when using Getter functions. Secondary constructor values matched when using Getter functions after using Setter functions.

Test Case Matrix for PPALMS Unit Testing

Test Cases	Date Last Run	P (pass) or F (fail)
SETTINGS: Verifying Settings objects store and return the same values.		
SETTINGS-01	11/27/2022	P
SETTINGS-02	11/27/2022	P
SETTINGS-03	11/27/2022	P
SETTINGS-04	11/27/2022	P
SETTINGS-05	11/27/2022	P
SETTINGS-06	11/27/2022	P
SETTINGS-07	11/27/2022	P
SETTINGS-08	11/27/2022	P
SETTINGS-09	11/27/2022	P
SETTINGS-10	11/27/2022	P
SETTINGS-11	11/27/2022	P
SETTINGS-12	11/27/2022	P
SETTINGS-13	11/27/2022	P
SETTINGS-14	11/27/2022	P
BANK: Verifying QuestionBank functions work as intended.		
BANK-01	11/27/2022	P
BANK-02	11/27/2022	P
BANK-03	11/27/2022	P
BANK-04	11/27/2022	P
BANK-05	11/27/2022	P
BANK-06	11/27/2022	P
BANK-07	11/27/2022	P

GENERATOR: Verifying Questions are generated correctly.		
GENERATOR-01	11/27/2022	P
GENERATOR-02	11/27/2022	P
GENERATOR-03	11/27/2022	P
GENERATOR-04	11/27/2022	P
GENERATOR-05	11/27/2022	P
GRABBER: Verifying that lines are taken from a file correctly.		
GRABBER-01	11/27/2022	P
GRABBER-02	11/27/2022	P
GRABBER-03	11/27/2022	P
GRABBER-04	11/27/2022	P
GRABBER-05	11/27/2022	P
GRABBER-06	11/27/2022	P
GRABBER-07	11/27/2022	P
GRABBER-08	11/27/2022	P
GRABBER-09	11/27/2022	P
GRABBER-10	11/27/2022	P
GRABBER-11	11/27/2022	P
GRABBER-12	11/27/2022	P