

## Software test protocol – PTGL 3.0 Web frontend

Functional tests / Black box

### Test

Tester (Name)	
Test date & time	
Notes on the test	Searching by graphlet similarity is not tested. Limited tests against the REST API are run from the browser.

### Testing environment

<b>Server</b>	SuSE 13.1 64 Bit on kelvin.molbi (Apache 2.2, PHP 5.6, Postgres 9.2)
Software version (SVN rev.)	
Test data set on server (DB content)	All PDB files which are in <i>trunk/plcc/data/input/</i> at the revision listed above, and no other PDB files, are contained in the database. (See test preparation instructions below.)
Notes on settings for the server side	Searching by graphlet similarity is disabled in config file.
<b>Client</b> (OS, browser version)	
Notes on settings on the client side	JavaScript is enabled in the browser.

## Test preparation instructions – Server

**These instructions have to be followed before running the test on the server.** They prepare the test environment and ensure the correct test data is in the database, so that the test cases lead to the expected results.

Task name	Description
Update and compile plcc	Checkout plcc, compile it in NetBeans, copy resulting JAR file and libs to <i>trunk/plcc/testrun/</i> dir
Recreate database	Run plcc with option to recreate database: <code>./plcc NONE -r</code>
Fill database with test data	Delete all PDB and DSSP files which may be in your <i>testrun/</i> dir. Then copy all PDB and DSSP files from <i>trunk/plcc/data/input/</i> to <i>trunk/plcc/testrun/</i> . Run the <i>fill_database.sh</i> shell script.
Update representative chain labels in DB	Update representative chains from the 40% sequence clustering (PDB XML file). This is done by running plcc with the following command line from <i>testrun/</i> dir: <code>./plcc NONE --set-pdb-representative-chains ../data/pdb/representatives.xml remove</code>
Copy data to web dir	Copy the data (plcc output images and graph files) from <i>testrun/</i> to the web application <i>data/</i> dir
Run maintenance tasks	User <code>http://&lt;PTGL3&gt;/maintenance.php</code> to run the maintenance tasks (both <i>linnot</i> task and <i>content stats</i> task).

## Page 1: Main page (including navigation bar and footer)

Test subject	Input data	Expected output	Test result
Text and image format	-	Text and images are formatted and displayed properly on the web page.	
Text and image format	JavaScript is turned off temporarily in the browser, then the page is reloaded.	A page notifying the user that JS is required is shown.	
Hyperlinks	-	All hyper links are non-dead and lead to proper pages. (This includes navigation bar links, footer links, and the help links in the SearchMotifs area.)	
Menu	-	The menu can be extended and all menu items can be clicked.	
Search area – keyword search – PDB ID	“7t”	<ul style="list-style-type: none"> <li>• Auto-completion works and proper proteins are suggested, including “7tim”.</li> <li>• Clicking on the suggestion “7tim” places it in the input text box above, and closes the suggestion.</li> <li>• Clicking the search button</li> </ul>	

Test subject	Input data	Expected output	Test result
		now transfers the user to the Search page.	
Search area – keyword search – short entry	“7t” in the input field, ignoring the auto-completion results, and clicking the search button	<ul style="list-style-type: none"> <li>• A message telling the user to enter at least 3 characters is shown</li> <li>• The user is NOT transferred to the search page</li> </ul>	
Search area – keyword search – keyword	“intramol”	Auto-completion works and proper proteins are suggested, including “7tim – INTRAMOLECULAR OXIDUREDUCTASE”	
Search area – keyword search – keyword	“xxx”	“No results found” is displayed	

## Page 2.1: Search Page – From Main Page: Standard search (“PDB ID or keyword”)

Test subject	Input data	Expected output	Test result
Search for specific PDB ID	Search for '7tim' from Main page	<ul style="list-style-type: none"> <li>Search type is keyword search.</li> <li>Both chains A and B of 7tim are listed, no other chains are listed.</li> <li>The CATH, PDB and FASTA links work.</li> <li>The result header is correct (“Showing results 1 to 2 (of 2 total)”).</li> <li>The buttons above work and are labeled properly (“Load proteins”, “Select all 2 protein chains”, “Deselect all”).</li> </ul>	
Search for a general keyword	Search for 'intramol' from Main page	<ul style="list-style-type: none"> <li>Search type is keyword search.</li> <li>A list of chains is shown, including both chains A and B of 7tim.</li> <li>The CATH, PDB and FASTA links</li> </ul>	

Test subject	Input data	Expected output	Test result
		<p>work.</p> <ul style="list-style-type: none"> <li>The result header is correct (“Showing results x to y (of z total)”).</li> <li>The buttons above work and are labeled properly (“Load proteins”, “Select all n protein chains”, “Deselect all”).</li> </ul>	
Search box in navigation bar	“8icd”	<ul style="list-style-type: none"> <li>Auto-completion works in the nav bar search field</li> <li>Searching leads back to the current page, but with results for 8icd</li> </ul>	
Search box in navigation bar, short search term	“ic”, ignoring suggestions, and clicking the search button	<ul style="list-style-type: none"> <li>A message telling the user to enter at least 3 characters is shown</li> <li>The user stays on the search page with the current result.</li> </ul>	

**Page 2.2: Search Page – From Main Page: Advanced search**

Test subject	Input data	Expected output	Test result
Search for PDB ID only	“7tim” in advanced search field “PDB Identifier”	<ul style="list-style-type: none"> <li>The user is transferred to the results page</li> <li>Search type is advanced search</li> <li>Both chains “A” and “B” of 7tim are listed</li> <li>Result header is correct (“1 to 2 of 2”)</li> </ul>	
Search for PDB ID, but input length is not 4	In advanced search field “PDB Identifier”: <ul style="list-style-type: none"> <li>None at all (just click button)</li> <li>“7t”</li> <li>“hallotoolong”</li> </ul>	<ul style="list-style-type: none"> <li>Too short: an error message is shown on the main page that PDB ID has length 4</li> <li>Too long: cannot be entered</li> <li>The user is not transferred to the results page</li> </ul>	
Search for PDB ID which is not in the database	In advanced search field “PDB Identifier”: <ul style="list-style-type: none"> <li>“1xxx”</li> </ul>	<ul style="list-style-type: none"> <li>The user is transferred to the results page</li> <li>Search type is advanced search</li> <li>No chains are listed</li> <li>A search hint message is shown, to try again with</li> </ul>	

Test subject	Input data	Expected output	Test result
		other query <ul style="list-style-type: none"> <li>Result header is correct ("0 to 0 of 0")</li> </ul>	
Search for valid PDB ID and text that does occur in its title	<ul style="list-style-type: none"> <li>"7tim" in field "PDB Identifier"</li> <li>"triosephosphate" in field "Title"</li> </ul>	Both chains of 7tim are shown on results page	
Search for valid PDB ID and text that does NOT occur in its title	<ul style="list-style-type: none"> <li>"7tim" in field "PDB Identifier"</li> <li>"oxygen" in field "Title"</li> </ul>	The search result in empty	
Search for valid PDB ID with ligand, ligand search	<ul style="list-style-type: none"> <li>"7tim" in field "PDB Identifier"</li> <li>Field "Has Ligand" set to "Yes"</li> </ul>	Both chains of 7tim are shown on results page	
Search for valid PDB ID with ligand, ligand search	<ul style="list-style-type: none"> <li>"7tim" in field "PDB Identifier"</li> <li>Field "Has Ligand" set to "No"</li> </ul>	The search result in empty	
Search for valid PDB ID without ligand, ligand search	<ul style="list-style-type: none"> <li>"1aar" in field "PDB Identifier"</li> <li>Field "Has Ligand" set to "Yes"</li> </ul>	The search result in empty	
Search for valid PDB ID without ligand, ligand search	<ul style="list-style-type: none"> <li>"1aar" in field "PDB Identifier"</li> <li>Field "Has Ligand" set to "No"</li> </ul>	Both chains "A" and "B" of 1aar are shown on results page	
Search by ligand name	<ul style="list-style-type: none"> <li>"ICT" in field "Ligand Name"</li> <li>Box "Has Ligand" = "Both"</li> </ul>	A list of chains, including 8icd chain A, is shown on the search page	
Search by ligand name	<ul style="list-style-type: none"> <li>"ICT" in field "Ligand Name"</li> </ul>	A list of chains, including 8icd chain A,	



Test subject	Input data	Expected output	Test result
	<ul style="list-style-type: none"> <li>Box “Has Ligand” = “Yes”</li> </ul>	is shown on the search page	
Search by molecule	<ul style="list-style-type: none"> <li>“ASPARAGINE SYNTHETASE” in field molecule</li> </ul>	<ul style="list-style-type: none"> <li>Only 12as is contained in the result list</li> </ul>	
Search by molecule, not contained	<ul style="list-style-type: none"> <li>“TEST2345” in field molecule</li> </ul>	<ul style="list-style-type: none"> <li>The search result is empty</li> </ul>	
Search by ligand name	<ul style="list-style-type: none"> <li>“ICT” in field “Ligand Name”</li> <li>Box “Has Ligand” set to “No”</li> </ul>	The result set is empty	
Combination	<ul style="list-style-type: none"> <li>“8icd” in field “PDB Identifier”</li> <li>“Regulation” in field “Title”</li> <li>Box “Has Ligand” set to “Yes”</li> <li>“ICT” in field “Ligand Name”</li> </ul>	8icd chain A is the only chain in the result list	

## Page 2.3: Search Page – From Main Page: Motif search

Test subject	Input data	Expected output	Test result
Four Helix Bundle search	Expand motif search and select Four Helix Bundle	<ul style="list-style-type: none"> <li>3nwm chain A is contained in result set</li> </ul>	
Globin Fold search	Expand motif search and select Globin Fold	<ul style="list-style-type: none"> <li>3whm chains B and F are contained in the result set (hemoglobin)</li> </ul>	
Up and Down Barrel search	Expand motif search and select Up and Down Barrel	<ul style="list-style-type: none"> <li>1ave (avidin) is contained in the result set</li> </ul>	
Immunoglobulin Fold search	Expand motif search and select Immunoglobulin Fold	<ul style="list-style-type: none"> <li>1igt and 1hzh antibodies are contained in the result list</li> </ul>	
Beta Propeller search	Expand motif search and select Beta Propeller	<ul style="list-style-type: none"> <li>1nr0, chain A is contained in the result list</li> </ul>	
Jelly Roll search	Expand motif search and select Jelly Roll	<ul style="list-style-type: none"> <li>1ayn is contained in the result list</li> </ul>	

**Page 2.4: Search Page – From Main Page: Custom linnot search**

Note: Using the 'and similar' checkbox means that like '%<input>%' is used instead of '= <input>'.

Test subject	Input data	Expected output	Test result
ADJ	<ul style="list-style-type: none"> <li>• Notation: “ADJ”</li> <li>• graph: “albelig”</li> <li>• query: “h,2ph”</li> <li>• similar: on</li> </ul>	<ul style="list-style-type: none"> <li>• Contains 7tim chain A, due to FG #1: <b>[h,2ph]</b></li> <li>• Contains 4w2c, chain L, due to FG #0: {e,2pe,-5pe,1ae,1ae,1mh,1mh,3pe,1ze,2mh,<b>2ph</b>,-1me}</li> </ul>	
ADJ	<ul style="list-style-type: none"> <li>• Notation: “ADJ”</li> <li>• graph: “albelig”</li> <li>• query: “h,2ph”</li> <li>• similar: off</li> </ul>	<ul style="list-style-type: none"> <li>• The result set is empty</li> </ul>	
ADJ	<ul style="list-style-type: none"> <li>• Notation: “ADJ”</li> <li>• graph: “albelig”</li> <li>• query: “[h,2ph]”</li> <li>• similar: off</li> </ul>	<ul style="list-style-type: none"> <li>• Contains 7tim chain A, due to FG #1: <b>[h,2ph]</b></li> <li>• Does NOT contain 4w2c, chain L</li> </ul>	
SEQ	<ul style="list-style-type: none"> <li>• Notation: “SEQ”</li> <li>• graph: “albe”</li> <li>• query: “3h,1e,1e,1h”</li> <li>• similar: on</li> </ul>	<ul style="list-style-type: none"> <li>• Search result contains 12as, due to {h,1e,<b>3h,1e,1e,1h</b>,1e,1h,1h,1e,1e,1e,4e,1h}</li> <li>• ...and nothing else</li> </ul>	

## Page 2.4: Search Page – From Main Page: Random search

Test subject	Input data	Expected output	Test result
Random 5	<ul style="list-style-type: none"><li>• 5 chains</li></ul>	<ul style="list-style-type: none"><li>• 5 random chains are shown</li></ul>	
Random 50, navigation	<ul style="list-style-type: none"><li>• 20 chains</li></ul>	<ul style="list-style-type: none"><li>• 25 random chains are shown</li></ul>	

### Page 3: About Page

Test subject	Input data	Expected output	Test result
Text and image format	-	Text and images are formatted and displayed properly on the web page.	
Hyperlinks	-	All hyper links are non-dead and lead to proper pages.	

**Note in the page *User Guide*: this page is part of the Main page and has thus already been tested.**

## Page 4: Retrieve – All protein graphs of a chain

Test subject	Input data	Expected output	Test result
Text and image format	-	Text and images are formatted and displayed properly on the web page.	
Search (valid)	<ul style="list-style-type: none"> <li>• “7timA” as PDB chain</li> </ul>	<ul style="list-style-type: none"> <li>• The user is transferred to the <i>results.php</i> page</li> <li>• The URL shows the correct query (<i>results.php?q=7timA</i>)</li> </ul>	
Search (invalid)	<ul style="list-style-type: none"> <li>• – (leave PDB chain empty)</li> </ul>	<ul style="list-style-type: none"> <li>• A pop-up message notifying the user that input should have exactly 5 letters is shown</li> <li>• User stays on page</li> </ul>	
Search (invalid)	<ul style="list-style-type: none"> <li>• “waytoolong” as PDB chain</li> </ul>	<ul style="list-style-type: none"> <li>• The input cannot be entered, as a max of 5 chars is allowed by the form</li> </ul>	

**Page 5: Retrieve – All folding graphs of a protein graph**

Test subject	Input data	Expected output	Test result
Text and image format	-	Text and images are formatted and displayed properly on the web page.	
Search (valid)	<ul style="list-style-type: none"> <li>• “7timA” as PDB chain</li> <li>• graph type “Alpha”</li> <li>• notation “ADJ”</li> </ul>	<ul style="list-style-type: none"> <li>• The page is reloaded and the search results show up</li> <li>• The selections in the drop-down boxes have been saved</li> <li>• The URL shows the correct query (<i>foldingsgraphs.php?pdbchain=7timA&amp;graphtype_int=1&amp;notationtype=adj</i>)</li> <li>• The table is displayed correctly and its links work</li> <li>• The FG images below are shown and formatted properly</li> <li>• The download links for the images and graph files work</li> <li>• For FGs consisting of</li> </ul>	

Test subject	Input data	Expected output	Test result
		only 1 vertex, no images are shown, but an info text explaining why is shown instead	
Search (invalid)	<ul style="list-style-type: none"> <li>– (leave PDB chain empty)</li> <li>rest does not matter</li> </ul>	<ul style="list-style-type: none"> <li>A pop-up message notifying the user that input should have exactly 5 letters is shown</li> <li>User stays on page</li> </ul>	
Search (invalid)	<ul style="list-style-type: none"> <li>“waytoolong” as PDB chain</li> <li>rest does not matter</li> </ul>	<ul style="list-style-type: none"> <li>The input cannot be entered, as a max of 5 chars is allowed by the form</li> </ul>	
Search (valid) for numeric chain ID	<ul style="list-style-type: none"> <li>PDB “1lmb”</li> <li>chain “1”</li> </ul>	<ul style="list-style-type: none"> <li>All data on the results page is shown correctly</li> </ul>	



**Page 6: Retrieve – All linear notations of a folding graph**

Test subject	Input data	Expected output	Test result
Text and image format	-	Text and images are formatted and displayed properly on the web page.	
Search (valid)	<ul style="list-style-type: none"> <li>• “7timA” as PCB chain</li> <li>• graph type “Alpha”</li> </ul>	<ul style="list-style-type: none"> <li>• The page is reloaded and results are displayed</li> <li>• The selections in the drop-down boxes have been saved</li> <li>• The URL shows the correct query (<i>linnots_of_foldinggraph.php?pdbchain=7timA&amp;graphtype_int=1</i>)</li> <li>• The table is shown correctly and its links work</li> <li>• The images for all 4 notations are listed below and image content is correctly</li> <li>• If KEY is undef, no KEY image is shown</li> </ul>	
Search (invalid)	<ul style="list-style-type: none"> <li>• – (leave PDB</li> </ul>	<ul style="list-style-type: none"> <li>• A pop-up</li> </ul>	

Test subject	Input data	Expected output	Test result
	chain empty) <ul style="list-style-type: none"> <li>rest does not matter</li> </ul>	message notifying the user that input should have exactly 5 letters is shown <ul style="list-style-type: none"> <li>User stays on page</li> </ul>	
Search (invalid)	<ul style="list-style-type: none"> <li>“waytoolong” as PDB chain</li> <li>rest does not matter</li> </ul>	<ul style="list-style-type: none"> <li>The input cannot be entered, as a max of 5 chars is allowed by the form</li> </ul>	

**Page 7: Results (Protein graphs) – URL set to: *results.php?q=7timA+7timB+1xxxF+8icdA***

Test subject	Input data	Expected output	Test result
Base text format	See URL above	Text and images are formatted and displayed properly on the web page in the sections above and below the actual search results. This excludes results (image sliders and SSE table), which are tested below.	
Changing between result chains (with the arrow navigation elements on the left and right)	<ul style="list-style-type: none"> <li>• See URL above</li> <li>• click the left and right arrows</li> </ul>	<ul style="list-style-type: none"> <li>• All chains listed in the URL appear (including 1xxxF, which is not contained in DB, and 8icdA, which comes after it)</li> <li>• The pages for 1xxxF and 8icdA (like all others) are both displayed and formatted properly</li> </ul>	
Protein graph display	<ul style="list-style-type: none"> <li>• Navigate to the result chain 7tim A</li> </ul>	<ul style="list-style-type: none"> <li>• The active graph image (alpha graph) and the 6 thumbnails for all graph types are displayed properly</li> <li>• One can switch between the 6</li> </ul>	

Test subject	Input data	Expected output	Test result
		<p>images using the thumbnails, and the proper one is shown enlarged in the main image section</p> <ul style="list-style-type: none"> <li>• The 3D-View / JMOL link works (that page is tested separately later, just check link)</li> <li>• The link “Go to folding graphs” works properly</li> <li>• The image and graph text file download links all work and lead to the currently selected graph type (check with all 6 graph types selected)</li> </ul>	
SSE table	<ul style="list-style-type: none"> <li>• Navigate to the result chain 7tim A</li> </ul>	<ul style="list-style-type: none"> <li>• The SSE table shows all 22 SSEs of 7tim chain A</li> <li>• The SSE numbers and labels match the data in the image (for all 6 images)</li> </ul>	

## Page 8: Database content overview

Test subject	Input data	Expected output	Test result
Page format	-	Text and images are formatted and displayed properly on the web page. This includes the JS plots.	
Content	-	<ul style="list-style-type: none"><li>• The displayed numbers and data fit the DB contents</li><li>• The number of non-redundant protein chains is not 0</li></ul>	

## Page 9: Database – All linear notations

Test subject	Input data	Expected output	Test result
Page format	-	Text and images are formatted and displayed properly on the web page.	
Content	-	<ul style="list-style-type: none"> <li>The displayed numbers and data fit the DB contents</li> <li>The number of non-redundant protein chains is not 0</li> </ul>	
Search	<ul style="list-style-type: none"> <li>Graph type: "Beta"</li> <li>Notation: "KEY"</li> </ul>	<ul style="list-style-type: none"> <li>The page is reloaded and a properly formatted result list is shown</li> <li>The selections in the drop-down boxes have been saved (Beta+KEY)</li> <li>Clicking a linnot string leads to the results page (search.php), the url indicates search for correct data, and the result list is non-empty</li> </ul>	
Search	<ul style="list-style-type: none"> <li>Graph type: "Alpha-Beta"</li> </ul>	<ul style="list-style-type: none"> <li>The page is reloaded and a</li> </ul>	

Test subject	Input data	Expected output	Test result
	<p>Ligand”</p> <ul style="list-style-type: none"> <li>• Notation: “ADJ”</li> </ul>	<p>properly formatted result list is shown</p> <ul style="list-style-type: none"> <li>• The selections in the drop-down boxes have been saved (Alpha-Beta Ligand+ADJ)</li> <li>• Clicking a linnot string leads to the results page (search.php), the url indicates search for correct data, and the result list is non-empty</li> <li>• One can navigate between the results using 'next' and 'previous' buttons, and the selections in the drop-down are saved (Alpha-Beta Ligand+ADJ)</li> </ul>	

## Page 10: Database – Motif overview

Test subject	Input data	Expected output	Test result
Page format	-	Text and images are formatted and displayed properly on the web page.	
Content	-	<ul style="list-style-type: none"><li>• The displayed numbers and data fit the DB contents</li><li>• The motif info links in the top table work</li></ul>	
Function		<ul style="list-style-type: none"><li>• The motif search links in the table work, and show the expected number of result chains</li></ul>	



## Page 11: Database – REST API

Test subject	Input data	Expected output	Test result
Page format	-	<ul style="list-style-type: none"><li>• Text and images are formatted and displayed properly on the web page.</li><li>• A working link to the API documentation is given at the bottom of the page.</li></ul>	

## Page 12: Meta – Publications

Test subject	Input data	Expected output	Test result
Page format and links	-	<ul style="list-style-type: none"><li>• Text and images are formatted and displayed properly on the web page.</li><li>• The links work</li></ul>	

### Page 13: Meta – Citing

Test subject	Input data	Expected output	Test result
Page format and links	-	<ul style="list-style-type: none"><li>• Text and images are formatted and displayed properly on the web page.</li><li>• The links work</li></ul>	

## Page 14: Meta – Contact

Test subject	Input data	Expected output	Test result
Page format and links	-	<ul style="list-style-type: none"><li>• Text and images are formatted and displayed properly on the web page.</li><li>• Contact data is up-to-date and correct</li><li>• The links work</li></ul>	

## Page 15: Meta – Imprint

Test subject	Input data	Expected output	Test result
Page format and links	-	<ul style="list-style-type: none"><li>• Text and images are formatted and displayed properly on the web page.</li><li>• Contact data is up-to-date and correct</li><li>• The links work</li></ul>	

## Page 16: REST API documentation (/api/)

Note on testing result data format: You should use an online JSON and XML validator to ensure that result data is in correct format. (Try JSONLint and the W3C XML validator.)

Test subject	Input data	Expected output	Test result
Page format, links	-	<ul style="list-style-type: none"> <li>Text and images are formatted and displayed properly on the web page.</li> <li>The links work</li> </ul>	
API calls via links in page	Clicking the links provided in the following sections: <ul style="list-style-type: none"> <li>Usage examples</li> <li>Metadata queries</li> <li>Collection queries</li> </ul>	<ul style="list-style-type: none"> <li>The data returned is in the correct format               <ul style="list-style-type: none"> <li>Usage examples                   <ul style="list-style-type: none"> <li>protein graphs (GML / JSON / XML)</li> <li>folding graphs (GML / JSON / XML)</li> <li>Linear notations (img / JSON)</li> </ul> </li> <li>Metadata queries (JSON)</li> <li>Collection queries (JSON)</li> </ul> </li> </ul>	

## Page 17: 3D View of protein graphs (JSMol)

Accessed from results.php of 7tim chain A, i.e., URL="3Dview.php?pdbid=7tim&chain=A&mode=allgraphs".

Test subject	Input data	Expected output	Test result
Page format, links	-	<ul style="list-style-type: none"> <li>Text and images are formatted and displayed properly on the web page.</li> <li>The links work</li> </ul>	
3D JSMol view	- (see URL above)	<ul style="list-style-type: none"> <li>The 3D view works</li> <li>The JSMol console is shown and works</li> <li>The 12 buttons are shown below the 3D view and they all work                             <ul style="list-style-type: none"> <li>alpha (s+c)</li> <li>beta (s+c)</li> <li>albe (s+c)</li> <li>alphalig (s+c)</li> <li>betalig (s+c)</li> <li>albelig (s+c)</li> </ul> </li> </ul>	