

SE465 Project

Clement Hoang, 20531116, SE465-001

Peter Li, 20522308, SE465-001

Sherwin Aminpour, 20529526, SE465-001

University of Waterloo
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Part (I)

- (a) See pi/partA.
- (b) False positives in software testing are errors in reporting in which a test incorrectly indicates the presence of a bug, when in reality there is nothing wrong with the corresponding code. In the case of the automated bug detection tool we built in part a, false positives exist because of the very nature of our testing process. Our tool makes inferences based on a belief system, in order to detect a specific type of bug - where a function is used without its implied necessary function pair. This method yields bugs based on a confidence threshold, but because it is based on a belief system, it can never be completely accurate. For example, in code that has a lot of bugs by nature, testing based on a belief system is very ineffective because it depends on the existing code.

When running httpd through our testing tool using the a support of 10 and a confidence of 80%, then our output is as follows:

```
bug: apr_hook_debug_show in ap_hook_post_read_request, pair: (apr_hook_debug_show, apr_hook_sort_register), support: 28, confidence: 87.50%
bug: apr_hook_debug_show in ap_hook_post_read_request, pair: (apr_array_make, apr_hook_debug_show), support: 28, confidence: 87.50%
bug: apr_hook_debug_show in ap_hook_post_read_request, pair: (apr_array_push, apr_hook_debug_show), support: 28, confidence: 87.50%
bug: apr_hook_debug_show in ap_hook_default_port, pair: (apr_hook_debug_show, apr_hook_sort_register), support: 28, confidence: 87.50%
bug: apr_hook_debug_show in ap_hook_default_port, pair: (apr_array_make, apr_hook_debug_show), support: 28, confidence: 87.50%
bug: apr_hook_debug_show in ap_hook_default_port, pair: (apr_array_push, apr_hook_debug_show), support: 28, confidence: 87.50%
bug: apr_hook_debug_show in ap_hook_http_scheme, pair: (apr_hook_debug_show, apr_hook_sort_register), support: 28, confidence: 87.50%
bug: apr_hook_debug_show in ap_hook_http_scheme, pair: (apr_array_make, apr_hook_debug_show), support: 28, confidence: 87.50%
bug: apr_hook_debug_show in ap_hook_http_scheme, pair: (apr_array_push, apr_hook_debug_show), support: 28, confidence: 87.50%
bug: apr_hook_debug_show in ap_hook_log_transaction, pair: (apr_hook_debug_show, apr_hook_sort_register), support: 28, confidence: 87.50%
bug: apr_hook_debug_show in ap_hook_log_transaction, pair: (apr_array_make, apr_hook_debug_show), support: 28, confidence: 87.50%
bug: apr_hook_debug_show in ap_hook_log_transaction, pair: (apr_array_push, apr_hook_debug_show), support: 28, confidence: 87.50%
bug: apr_array_push in ap_add_file_conf, pair: (apr_array_make, apr_array_push), support: 40, confidence: 80.00%
bug: apr_array_push in ap_add_per_dir_conf, pair: (apr_array_make, apr_array_push), support: 40, confidence: 80.00%
bug: apr_array_push in ap_add_per_url_conf, pair: (apr_array_make, apr_array_push), support: 40, confidence: 80.00%
bug: apr_array_make in ap_init_virtual_host, pair: (apr_array_make, apr_array_push), support: 40, confidence: 86.96%
bug: apr_array_push in set_server_alias, pair: (apr_array_make, apr_array_push), support: 40, confidence: 80.00%
bug: apr_array_make in create_core_server_config, pair: (apr_array_make, apr_array_push), support: 40, confidence: 86.96%
bug: apr_array_make in create_core_dir_config, pair: (apr_array_make, apr_array_push), support: 40, confidence: 86.96%
bug: apr_array_push in ap_file_walk, pair: (apr_array_make, apr_array_push), support: 40, confidence: 80.00%
bug: apr_array_push in ap_directory_walk, pair: (apr_array_make, apr_array_push), support: 40, confidence: 80.00%
bug: apr_array_make in ap_make_method_list, pair: (apr_array_make, apr_array_push), support: 40, confidence: 86.96%
bug: apr_array_push in ap_copy_method_list, pair: (apr_array_make, apr_array_push), support: 40, confidence: 80.00%
bug: apr_array_make in prep_walk_cache, pair: (apr_array_make, apr_array_push), support: 40, confidence: 86.96%
bug: apr_array_push in ap_location_walk, pair: (apr_array_make, apr_array_push), support: 40, confidence: 80.00%
bug: apr_array_push in ap_method_list_add, pair: (apr_array_make, apr_array_push), support: 40, confidence: 80.00%
bug: apr_thread_mutex_lock in apu_dso_mutex_lock, pair: (apr_thread_mutex_lock, apr_thread_mutex_unlock), support: 43, confidence: 95.56%
bug: apr_thread_mutex_unlock in apu_dso_mutex_unlock, pair: (apr_thread_mutex_lock, apr_thread_mutex_unlock), support: 43, confidence: 91.49%
bug: apr_thread_mutex_unlock in apr_dbd_mutex_unlock, pair: (apr_thread_mutex_lock, apr_thread_mutex_unlock), support: 43, confidence: 91.49%
bug: apr_thread_mutex_lock in apr_dbd_mutex_lock, pair: (apr_thread_mutex_lock, apr_thread_mutex_unlock), support: 43, confidence: 95.56%
bug: apr_array_push in apr_xml_insert_uri, pair: (apr_array_make, apr_array_push), support: 40, confidence: 80.00%
bug: apr_array_make in apr_xml_parser_create, pair: (apr_array_make, apr_array_push), support: 40, confidence: 86.96%
bug: apr_thread_mutex_unlock in apr_global_mutex_unlock, pair: (apr_thread_mutex_lock, apr_thread_mutex_unlock), support: 43, confidence: 91.49%
bug: apr_thread_mutex_unlock in apr_global_mutex_trylock, pair: (apr_thread_mutex_lock, apr_thread_mutex_unlock), support: 43, confidence: 91.49%
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From evaluating this output,

- (c) See pi/partC.

Part (II)

See pii/.