

Results from the Compiler Construction Competition

IMADA

May, 2016

Programs

Program	Group					
	1	2	3	4	5	7
C_ErrAssignToType.src			C_E	$C_E C_S$		C_E
C_ErrFuncParamsInvalidType.src			C_S	C_S		C_E
C_ErrFuncParamsTooFew.src			C_S	$C_E C_S$		C_E
C_ErrFuncParamsTooMany.src			C_E	$C_E C_S$		C_E
C_ErrInvalidToken.src			C_T	C_E		C_T
C_ErrTypeLoop.src			C_S	C_S		C_S
C_ErrUnmatchedBeginComment.src			C_E	C_E	C_E	C_E
C_NullWrong.src				$C_E C_S$		C_O^{****}
C_ReturnInMainScope.src			C_O	$C_E C_S$	C_E	C_S
F_FuncParamsEvalOrder.src			C_O	C_S	C_E	C_O
F_RecordIsTupleOrSet.src	C_E	C_E	C_S	C_S	C_E	$C_E C_O$
F_ShortCircuitAND.src	R_T		C_S	$C_E C_S$	$(C_E)^{**}$	$C_E C_O^{***}$
F_ShortCircuitOR.src	R_T		C_S	$C_E C_S$		$C_E C_O$
F_SimpleStructuralEquiv.src			C_E	$C_E C_S$	C_E	$C_E C_S$
O_AbsoluteValueTest.src	C_E	C_E	C_S	C_S	C_E	$C_E C_O^{***}$
O_AbsTest.src			R_S	C_S		C_O
O_ArrayComparisonsA.src			C_E	$C_E C_S$		$C_E C_S$
O_ArrayComparisonsB.src			C_E	$C_E C_S$		$C_E C_S$
O_ArrayIndex.src				$C_E C_O$		R_O
O_ArrayLength.src			C_E	$C_E C_S$		C_O
O_ArrayOfOwnType.src			C_E	$C_E C_S$	C_E	C_O
O_ArrayOfRecords.src			C_E	C_S		$C_E C_O$
O_Assoc.src			C_O	R_O		R_S
O_BinarySearchTree.src			C_E	$C_E C_S$		$C_E C_O$
O_Comments.src						
O_Factorial.src				R_E		
O_FuncCallAsParamA.src			C_S	$C_E C_S$		C_O
O_FuncCallAsParamB.src			C_O	R_O		C_O
O_FuncModifyingParams.src			C_O	$C_E C_S$		$C_E C_S$

Program	Group					
	1	2	3	4	5	7
O_FuncRedefinedInItself.src	C_E		C_S	$C_E C_S$		$C_E C_O^{****}$
O_FuncRedefinedReturnType.src			C_E	$C_E C_S$		
O_FuncRedefinedType.src			C_E	$C_E C_S$		
O_FuncReturnRecord.src			C_E	$C_E C_S$		$C_E C_O^{****}$
O_Function.src			C_S	$C_E C_S$	$(C_E)^{**}$	R_O
O_IfThen.src			R_O	$C_E C_S$		C_O
O_Knapsack.src	$(C_E)^*$		C_E	$C_E C_S$		C_S
O_LargeExpTreeA.src			C_O	R_O		
O_LargeExpTreeB.src			C_E	$C_E C_S$		
O_LargeExpTreeC.src			C_E	$C_E C_S$		R_O
O_MultiDimArray.src			C_E	C_S		$C_E C_O$
O_MultipleTypecheckPassesA.src	C_E		C_S	$C_E C_S$	C_E	$C_E C_O^{****}$
O_MultipleTypecheckPassesB.src	C_E		C_E	$C_E C_S$		$C_E C_S$
O_MultipleTypecheckPassesC.src	C_E		C_E	R_O	$(C_E)^{**}$	C_O
O_NullCorrect.src			C_E	$C_E C_S$		
O_RecordComparisonsA.src			C_E	$C_E C_S$		$C_E C_O^{****}$
O_RecordComparisonsB.src	C_E		C_E	$C_E C_S$		$C_E C_S$
O_RecordsWithArray.src			$C_E C_S$	$C_E C_S$		C_S
O_Recursion.src			R_O	$C_E C_S$		C_S
O_SimpleRecord.src			C_E	$C_E R_O$		C_S
O_StaticLink.src	C_E		$C_E C_S$	$C_E C_S$		C_O
O_StaticLinkA.src			C_S	$C_E C_S$		$C_E C_O^{****}$
O_StaticLinkB.src	C_E		C_E	C_E		$C_E C_O$
O_TypeJumpScope.src	C_E		C_S	$C_E C_S$	C_E	$C_E C_O^{****}$
O_WhileDo.src			R_S	C_S		C_S
R_ErrOutOfBounds1.src			R_O	$C_E C_S$	R_O	C_S
R_ErrOutOfBounds2.src			R_O	$C_E C_S$	R_O	C_S
R_ErrRuntimeDiv0.src			C_O	C_S	R_S	R_E
R_ErrRuntimeNegArraySize.src			C_E	$C_E C_S$	R_S	C_S
R_ErrRuntimeNullPointer.src			C_E	$C_E C_S$	R_S	R_E
R_ErrRuntimeOutOfMem.src	R_S	R_S	C_S	$C_E C_S$	R_S	$C_E C_O^{****}$

*: Symbols are collected in a single pass. Reordering functions makes the test pass

** : Minor bug causing the compiler to emit a few junk bytes at the end of the output. Removing those makes the test pass

***: Error output on stdout

****: No output on stdout. Compiler should likely have returned an error code

Total

Format: #all errors(#problematic errors)

Problem Type	Group					
	1	2	3	4	5	7
Compile-time	11(9)	2(0)	50	54	12(7)	47
Run-time	3	1	5	6	6	6
Total (of 60 tests)	14(12)	3	55	60	18(13)	53

Legend

Compile-time problems:

C_T : Compiler does not terminate.

C_E : Compiler gives no or incorrect error when an error during compilation was expected, or compiler gives an error when no error during compilation was expected.

$C_E(N)$: As C_E with the error code being N .

C_S : Compiler gives Segmentation fault or Floating exception.

C_O : The produced output cannot be assembled.

Run-time problems:

R_T : The compiled program does not terminate.

R_E : The compiled program gives no or incorrect runtime error when a runtime error was expected, or the compiled program gives a runtime error when no runtime error was expected.

$R_E(N)$: As R_E with the error code being N .

R_S : The compiled program gives Segmentation fault or Floating exception.

R_O : The compiled program produces incorrect output.

Time Trial on Knapsack

Compilation done using the -x switch (except when the compiler does not work with it). All tests performed on imada-106310, each program run 3 times. All results in seconds.

Compiler	First	Second	Third	Average
1	30.705	30.716	30.710	30.710
2	13.478	13.463	13.465	13.469
3	—	—	—	—
4	—	—	—	—
5	9.447	9.431	9.430	9.436
7	—	—	—	—
GCC 4.8.4	7.501	7.147	7.144	7.264
GCC O1	5.335	5.309	5.312	5.319
GCC O2	5.481	5.487	5.456	5.475
GCC O3	4.633	4.800	4.617	4.683
TA's	10.404	10.398	10.408	10.403

Extra Features

Feature	Group						
	1	2	3	4	5	7	
Garbage Collection		✓					
Register Allocation with liveness analysis		✓			✓		
Peephole optimization		✓			✓		
Structural equivalence	✓	✓					
Constant folding					✓		
Unit types/Discard keyword		✓			✓		
Run-time checks	✓	✓					
Unary minus	✓	✓					
Import statement		✓					
Standard library		✓					
Functional programming (limited)		✓					
Static strings		✓					
Detection of extra registers		✓					