Université catholique de Louvain
École polytechnique de Louvain
Pôle d'ingénierie informatique

LINGI2252
Software Engineering : measures and maintenance

Assignment step 4:
Study patterns of co-occurring code improvements

19th December 2014

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1 Introduction

2 Methodology

We have parsed the Pylint output to generate a table containing the correlations between the different error codes. We made three tables for three levels of analysis : by file, by class, and by method. Pylint generates error messages, and sometimes specify the class and the method concerned. For the file-level, we considered the messages where no class was specified. For the class-level, we only selected the messages where Pylint indicates a class. And for the method-level, we only considered the messages where Pylint indicates a method.

To refine our analysis, we removed some error codes that weren't relevant for the analysis. We discarded pairs of error codes that had high distances (greater than 0.9). And we excluded all pairs of critics for which one of the code-critics covers more than 90% of all source code entities analyzed.

3 Patterns of Co-occurring Critics

3.1 By file

Unfortunate Correlation

This section contains pairs of error codes that have quite a low distance, but the error codes don't have something in common.

Correlation	0.50
C0322	Operator not preceded by a space
R0904	Too many public methods (%s/%s)

Correlation	0.67
C0322	Operator not preceded by a space
R0911	Too many return statements (%s/%s)

Correlation	0.50
C0322	Operator not preceded by a space
R0912	Too many branches (%s/%s)

Correlation	0.50
C0322	Operator not preceded by a space
W0106	Expression "%s" is assigned to nothing

Correlation	0.50
C0322	Operator not preceded by a space
W0404	Reimport %r (imported line %s)

Correlation	0.67
C0322	Operator not preceded by a space
W0631	Using possibly undefined loop variable %r

TODO

Correlation	0.60
E0611	No name %r in module %r
W0232	Class has no __init__ method

Correlation	0.70
E1101	%s %r has no %r member
R0914	Too many local variables (%s/%s)

Correlation	0.50
R0911	Too many return statements (%s/%s)
R0912	Too many branches (%s/%s)

Correlation	0.50
R0911	Too many return statements (%s/%s)
W0404	Reimport %r (imported line %s)

Correlation	0.67
R0911	Too many return statements (%s/%s)
W0631	Using possibly undefined loop variable %r

Correlation	0.50
R0912	Too many branches (%s/%s)
W0631	Using possibly undefined loop variable %r

Correlation	0.68
R0913	Too many arguments (%s/%s)
R0914	Too many local variables (%s/%s)

Correlation	0.67
R0914	Too many local variables (%s/%s)
W0612	Unused variable %r

Correlation	0.50
W0404	Reimport %r (imported line %s)
W0631	Using possibly undefined loop variable %r

Correlation	0.69
W0612	Unused variable %r
W0621	Redefining name %r from outer scope (line %s)

3.2 By class

3.3 By method

Correlation	0.60
C0203	Metaclass method %s should have mcs as first argument
W0602	W0602: Using global for %r but no assigment is done

Correlation	0.60
F0401	Unable to import %s
W0122	Use of exec

Appendices

Excluded codes : ['E1101', 'W0613', 'C0202', 'E0102', 'E0213', 'E0602', 'E0711', 'E1101', 'E1123', 'F0401', 'W0101', 'W0122']

/	C0203	C0321	C0324	E0101	E0203	E0211	E0710	E1002	R0911	R0912	R0913	R0914	W0102	W0201	W0221	W0231	W0232	W0233	W0403	W0404	W0602	W0612	W0621	W0622	W0631	W0701	W0702	W0703
C0203		0.88		0.50			0.75			0.75			0.83			0.50		0.67	0.75	0.80	0.50				0.50		0.67	0.67
C0321	0.88		0.86	0.86						0.89	0.84				0.85	0.86		0.88	0.89		0.86			0.75	0.86		0.88	0.88
C0324		0.86		0.89												0.89					0.89				0.89			
E0101	0.50	0.86	0.89							0.67			0.80					0.50	0.67	0.75						0.50	0.50
E0203										0.67																		
E0211															0.85											0.86		
E0710	0.75																											
E1002																0.88												
R0911																												
R0912	0.75	0.89		0.67	0.67							0.83	0.86			0.67		0.75	0.50	0.60	0.67			0.67		0.75	0.75	0.75
R0913		0.84										0.82						0.87						0.78				
R0914										0.83	0.82			0.87					0.89			0.88	0.89	0.81				
W0102	0.83			0.80						0.86						0.80		0.83	0.86	0.88	0.80				0.80		0.83	0.83
W0201												0.87																
W0221		0.85				0.85				0.67								0.50	0.67	0.75				0.83		0.88		
W0231	0.50	0.86	0.89										0.80														0.50	0.50
W0232								0.88																				
W0233	0.67	0.88		0.50						0.75	0.87		0.83			0.50			0.75	0.80	0.50				0.50		0.67	0.67
W0403	0.75	0.89		0.67						0.50		0.89	0.86			0.67		0.75		0.60	0.67			0.67		0.75	0.75
W0404	0.80			0.75						0.60			0.88			0.75		0.80	0.60		0.75		0.83	0.75		0.80	0.80
W0602	0.50	0.86	0.89							0.67			0.80					0.50	0.67	0.75						0.50	0.50
W0612												0.88											0.89	0.89				
W0621												0.89								0.83		0.89						
W0622		0.75									0.78	0.81			0.83							0.89						
W0631	0.50	0.86	0.89							0.67			0.80					0.50	0.67	0.75						0.50	0.50
W0701						0.86									0.88													
W0702	0.67	0.88		0.50						0.75			0.83			0.50		0.67	0.75	0.80	0.50				0.50			0.67
W0703	0.67	0.88		0.50						0.75			0.83			0.50		0.67	0.75	0.80	0.50				0.50		0.67	

Excluded codes : ['E0702', 'F0401', 'W0102', 'W0105', 'W0201']

/	C0321	C0322	C0324	E0602	E0611	E1002	E1101	E1120	E1123	R0904	R0911	R0912	R0913	R0914	W0106	W0231	W0232	W0404	W0612	W0613	W0621	W0622	W0631	W0702	W0703
C0321		0.80		0.88	0.83		0.89	0.80	0.83	0.75				0.87	0.75					0.85					
C0322	0.80		0.88	0.83						0.50	0.67	0.50		0.85	0.50			0.50					0.67	0.80	
C0324		0.88		0.80	0.89		0.86	0.88	0.89		0.88	0.86	0.88	0.82		0.88		0.86	0.80	0.88	0.78		0.88	0.78	
E0602	0.88	0.83	0.80		0.86			0.83	0.86		0.83	0.80	0.87	0.88				0.80	0.88	0.77	0.82	0.88	0.83	0.88	
E0611	0.83		0.89	0.86				0.75	0.80								0.60								
E1002																	0.75								
E1101	0.89		0.86					0.88	0.89				0.79	0.70		0.88			0.79	0.88	0.77	0.80	0.88		
E1120	0.80		0.88	0.83	0.75		0.88		0.75					0.85											
E1123	0.83		0.89	0.86	0.80		0.89	0.75						0.86							0.88				
R0904	0.75	0.50																							
R0911		0.67	0.88	0.83								0.50						0.50					0.67	0.80	
R0912		0.50	0.86	0.80							0.50												0.50	0.75	
R0913			0.88	0.87			0.79							0.68					0.79	0.79	0.83				0.83
R0914	0.87	0.85	0.82	0.88			0.70	0.85	0.86				0.68						0.67	0.86	0.73			0.87	
W0106	0.75	0.50																							
W0231			0.88				0.88																		
W0232					0.60	0.75															0.88				
W0404		0.50	0.86	0.80							0.50												0.50	0.75	
W0612			0.80	0.88			0.79						0.79	0.67						0.87	0.69	0.84		0.83	
W0613	0.85		0.88	0.77			0.88						0.79	0.86					0.87		0.82	0.86			
W0621			0.78	0.82			0.77		0.88				0.83	0.73			0.88		0.69	0.82		0.88		0.81	
W0622				0.88			0.80												0.84	0.86	0.88		0.85	0.87	
W0631		0.67	0.88	0.83			0.88				0.67	0.50						0.50				0.85		0.80	
W0702		0.80	0.78	0.88							0.80	0.75		0.87				0.75	0.83		0.81	0.87	0.80		
W0703													0.83												

Excluded codes : ['E1101', 'R0913', 'R0914', 'W0612', 'W0613', 'W0621', 'C0202', 'C0321', 'C0322', 'C0324', 'E0101', 'E0102', 'E0211', 'E0213', 'E0611', 'E0702', 'E0710', 'E0711', 'E1002', 'E1101', 'E1123', 'R0901', 'R0902', 'R0904', 'R0911', 'W0101', 'W0102', 'W0105', 'W0106', 'W0201', 'W0221', 'W0232', 'W0403', 'W0613', 'W0622', 'W0701', 'W0702', 'W0703']

/	C0203	E0203	E0602	E1120	F0401	R0912	W0122	W0231	W0233	W0404	W0602	W0631
C0203											0.60	
E0203						0.80						
E0602												
E1120												
F0401							0.50					
R0912		0.80								0.83		0.88
W0122					0.50							
W0231									0.81			
W0233								0.81				
W0404						0.83						
W0602	0.60											
W0631						0.88						