研究问题1：多样性

商业模式：

**Commercial:** AETG, TESTONA, Pro-Test, Bender RBT, TestCover, ATD, Hexawise, MoSo-PoLiTe, FOCUS, pairwiser, rdExpert (11)

**Open source/ Free use:** AllPairs, AllPairs, Jenny, Test Vector Generator, SpecExporer, Jwrap, PICT, ACTS, PictMaster, CASA, Nunit, pairwise, VPTAG, PWiseGen, TestTwo, tcases, NTestCaseBuilder, SPLCATool, Jcombinatorial, CTWeb, CitLab, PLEDGE, ecFeed, pairwise, CCM, JCUnit, ct\_common, Xunit.Combinatorial, BEN, covering-arrays, generateMCA, CCMCL, KTK, medici, Covering-Array-Generator, CHiP, CTWedge, cametrics, CSCM, CAGen, Covering\_Arrays, covering-arrays-from-msequences, coffee4j, Pairwise Online Tool, QICT, DPSO, AETGTestSuiteGenerator, Pairwise\_algorithms, CAGenAlgos, CIT-BACH, yactt, DVA313-02, covering\_arrays\_validator, OAs, CoveringArray, pairwise-testing, greedy\_covering, pairwise-testing, GenPairs, Nenya, beanfiller-tcases, pairwise\_test\_case\_genrator, jpwise, on-wise

**Unknown:** Tconfig, CTS, Intelligent Test Case Handler, OATSGen, JTst, EXACT, ATIG, CPUT, Ttuples, PWTool, Cascade, Eris, CPTG

跨平台特征

跨平台：AETG, AllPairs, CTS, AllPairs, TestCover, Jenny, Test Vector Generator, PICT, OATSGen, ACTS, JTst, Hexawise, pairwise, VPTAG, PWiseGen, TestTwo, tcases, CPUT, FOCUS, SPLCATool, Jcombinatorial, CTWeb, CITLAB, PLEDGE, ecFeed, PWTool, pairwise, CCM, JCUnit, ct\_common, BEN, pairwiser, covering-arrays, CCMCL, medici, Covering-Array-Generator, CTWEDGE, cametrics, CSCM, CAGen, Covering\_Arrays, covering-arrays-from-msequences, coffee4j, Pairwise Online Tool, QICT, DPSO, AETGTestSuiteGenerator, Pairwise\_algorithms, CAGenAlgos, CIT-BACH, yactt, covering\_arrays\_validator, OAs, CoveringArray, pairwise-testing, greedy\_covering, pairwise-testing, Nenya, beanfiller-tcases, pairwise\_test\_case\_generator, jpwise, one-wise

Linux平台：CASA, GenPairs

Windows平台：TESTONA, Pro-Test, Bender RBT, SpecExporer, ATD, Jwrap, PictMaster, Nunit, NTestCaseBuilder, Xunit.Combinatorial, generateMCA, KTK, rdExpert, DVA313-02

Unknown: Tconfig, Intelligent Test Case Handler, EXACT, ATIG, MoSo-PoLiTe, Ttuples, Cascade, Eris, CPTG, CHiP,

开发语言：

Java: TESTONA, Test Vector Generator, Intelligent Test Case Handler, ACTS, JTst, VPTAG, PWiseGen, tcases, CPUT, FOCUS, SPLCATool, Jcombinatorial, CITLAB, PLEDGE, ecFeed, pairwise (K), CCM, JCUnit, BEN, CCMCL, Covering-Array-Generator, CTWEDGE, coffee4j, CAGenAlgos, CIT-BACH, CoveringArray, Nenya, beanfiller-tcases, jpwise,

C/C++: CTS, Jenny, PICT, EXACT, CASA, Eris, ct\_common, covering-arrays, generateMCA, KTK, medici, DPSO, AETGTestSuiteGenerator,

Python: AllPairs, Covering\_Arrays, covering-arrays-from-msequences, covering\_arrays\_validator, OAs, pairwise-testing, GenPairs,

C#: SpecExporer, Nunit, Xunit.Combinatorial, QICT, DVA313-02,

Ruby: pairwise, TestTwo,

VB: Jwrap, PictMaster,

多种开发语言: Tconfig

其他: AllPairs (S), TestCover, NTestCaseBuilder, CPTG, cametrics, CSCM, CAGen, Pairwise\_algorithms, yactt, pairwise-testing, greedy\_covering, pairwise\_test\_case\_generator, one-wise

未知: AETG, Pro-Test, Bender RBT, ATD, OATSGen, Hexawise, ATIG, MoSo-PoLiTe, CTWeb, Ttuples, PWTool, Cascade, pairwiser, CHiP, Pairwise Online Tool, rdExpert

使用形式

单机图形界面：TESTONA, Pro-Test, Bender RBT, Test Vector Generator, ATD, Jwrap, PictMaster, VPTAG, CPUT, FOCUS, CCM, rdExpert, DVA313-02 (13)

多种形式：TestCover, PICT, ACTS, tcases, PLEDGE, ecFeed, BEN, CTWEDGE, cametrics, CAGen (10)

类库：AllPairs (M), CTS, Nunit, PWiseGen, NTestCaseBuilder, Jcombinatorial, pairwise, JCUnit, ct\_common, Xunit.Combinatorial, generateMCA, coffee4j, AETGTestSuiteGenerator, Pairwise\_algorithms, CAGenAlgos, CoveringArray, Nenya, beanfiller-tcases, jpwise, one-wise (20)

单机命令行：AllPairs (S), Jenny, CASA, pairwise (W), TestTwo, SPLCATool, covering-arrays, CCMCL, KTK, medici, Covering-Array-Generator, CHiP, CSCM, Covering\_Arrays, covering-arrays-from-msequences, QICT, DPSO, CIT-BACH, covering\_arrays\_validator, OAs, greedy\_covering, pairwise-testing, GenPairs (23)

web应用程序：AETG, OATSGen, Hexawise, CTWeb, PWTool, pairwiser, Pairwise Online Tool, yactt, pairwise-testing, pairwise\_test\_case\_generator (10)

插件：Intelligent Test Case Handler, SpecExporer, MoSo-PoLiTe, CITLAB (4)

未知：Tconfig, JTst, EXACT, ATIG, Ttuples, Cascade, Eris, CPTG (8)

主题

生成：AETG, Tconfig, Pro-Test, AllPairs (M), Jenny, Test Vector Generator, Intelligent Test Case Handler, ATD, Jwrap, PICT, OATSGen, JTst, EXACT, CASA, ATIG, pairwise, VPTAG, PWiseGen, TestTwo, tcases, MoSo-PoLiTe, CTWeb, Ttuples, PWTool, pairwise, Cascade, ct\_common, generateMCA, CPTG, KTK, medici, Covering-Array-Generator, CHiP, CTWEDGE, CAGen, Covering\_Arrays, covering-arrays-from-msequences, Pairwise Online Tool, QICT, DPSO, AETGTestSuiteGenerator, Pairwise\_algorithms, CAGenAlgos, CIT-BACH, yactt, DVA313-02, OAs, CoveringArray, pairwise-testing, greedy\_covering, pairwise-testing, GenPairs, beanfiller-tcases, pairwise\_test\_case\_generator, jpwise, one-wise (56)

评估：CCM, covering-arrays, CCMCL, cametrics, CSCM, covering\_arrays\_validator (6)

故障定位：BEN (1)

执行：Eris (1)

优化：CPUT (1)

生成+评估：Bender RBT, CTS, AllPairs (S), TestCover, ACTS, PictMaster, Hexawise, pairwiser (8)

生成+执行：SpecExporer, Nunit, NTestCaseBuilder, Jcombinatorial, Xunit.Combinatorial (5)

生成+执行+评估：SPLCATool, ecFeed, JCUnit (3)

其他功能：TESTONA, FOCUS, CITLAB, PLEDGE, coffee4j, rdExpert, Nenya (7)

生成方法

一次一条贪心：AETG, AllPairs (M), AllPairs (S), Jenny, PICT, JTst, QICT, TestTwo, SPLCATool, pairwise (K), Xunit.Combinatorial, CIT-BACH, yactt,

基于参数顺序：OATSGen, ACTS, pairwise, VPTAG, Ttuples, PWTool,

基于贪心的约束可满足方法：MoSo-PoLiTe, Cascade,

集成其他工具：Jwrap, PictMaster, ATIG,

基于搜索的方法：ATD, CASA, Nunit, PWiseGen, generateMCA,

数学方法：Tconfig, CTS，TestCover, OAs

其他方法：TESTONA, EXACT, FOCUS, Jcombinatorial, ecFeed, DVA313-02,

多种方法：Bender RBT, CTWeb, CITLAB, JCUnit, DPSO, Pairwise\_algorithms, CAGenAlgos,

未知：Pro-Test, Test Vector Generator, Intelligent Test Case Handler, SpecExporer, Hexawise, tcases, NTestCaseBuilder, ct\_common, pairwiser,