# CS 498 ST Fall 2017

## CS498ST: Software Testing, Fall 2017

**Lecture Time:** Tuesday and Thursday, 3:30-4:45pm  
**Lecture Room:** 1109 SC  
**Instructor:** Tao Xie  
**TA:** Wing Lam

## Syllabus


## Schedule

This is a **tentative** schedule of lectures, and subject to change.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Slides</th>
<th>Reading</th>
<th>MP</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>08/29</td>
<td>Introduction</td>
<td>1</td>
<td></td>
<td></td>
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<tr>
<td>08/31</td>
<td>Introduction - cont.</td>
<td>1</td>
<td>Chapter 1</td>
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<tr>
<td>09/05</td>
<td>Test intro + DSE</td>
<td>intro, DSE</td>
<td>&quot;Symbolic Execution for Software Testing: Three Decades Later&quot; CACM'13</td>
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<tr>
<td>09/12</td>
<td>Test intro</td>
<td>intro, DSE</td>
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<tr>
<td>09/14</td>
<td>Test intro</td>
<td>intro</td>
<td>Generate unit tests for your code with IntelliTest</td>
<td>MP1: due Sept 24 Sunday 11:59pm US Central Time</td>
<td></td>
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| 09/19 | Parameterized Unit Tests (PUTs)                           | PUT    | Unit Tests Reloaded: Parameterized Unit Testing with Symbolic Execution  
<p>|       |                                                            |        | Sample Code: Set.cs, UnitStack.cs, UnitStackClass.cs (clean code under test without PUT) |
| 09/21 | Guest lecture                                              | regression |                                                   |          |                                              |
| 09/26 | Parameterized Unit Tests (PUTs) - Advanced Topics          | PUT exercises | Retrofitting Unit Tests for Parameterized Unit Testing |
| 09/28 | Guest lecture by Microsoft                                 | Slides | Integrating VSTS, Azure Web Apps, Visual Studio, and ASP.NET |
| 10/03 | Parameterized Unit Tests (PUTs) - Advanced Topics          | PUT-advanced | Retrofitting Unit Tests for Parameterized Unit Testing | MP2: due Oct 15 Sunday 11:59pm Champaign Time |
| 10/05 | PUTs + Testing Intro                                      | PUT-advanced + intro |                                                   |          |                                              |
| 10/10 | Testing Intro                                             | intro  | MP1 grading                                      |
| 10/12 | Testing Intro                                             | intro  |                                                   |          |                                              |</p>
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</tr>
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| 10/17 | Stubs/Shims | Slides on Faking It  
Isolating Code Under Test with Microsoft Fakes  
Using stubs to isolate parts of your application from each other for unit testing  
Using shims to isolate your application from other assemblies for unit testing  
Unit testing with Fakes with Visual studio Premium 2012 * Multiple stub methods can be combined using comma separator.*  
Lambda Expressions (C# Programming Guide) |
| 10/19 | Graph coverage | graphcov  
Representation and Analysis of Software.  
Graph Coverage Web App  
Data Flow Coverage Web App |
| 10/26 | Graph coverage, Logic coverage | graphcov  
logiccov  
Guided Test Generation for Coverage Criteria |
| 10/31 | Logic coverage with Pex/IntelliTest  
Syntax-based testing Program mutation testing | syntaxcov  
mutation  
• ISSRE 03 paper "Coverage Criteria for Logical Expressions" by Paul Ammann, Jeff Offutt and Hong Huang  
• ICSM 10 paper "Test Generation via Dynamic Symbolic Execution for Mutation Testing" |
| 11/02 | Syntax-based testing Program mutation testing | syntaxcov  
mutation |
| 11/09 | Syntax-based testing Program mutation testing  
Code Contracts | syntaxcov  
mutation  
codecontracts  
• Microsoft Research Code Contract |
| 11/14 | Code Contracts | codecontracts  
• Case Studies and Tools for Contract Specifications  
• Sample Code: Set.cs , UIntStack.cs, UnitStackClass.cs (clean code under test without PUT) |
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| 11/16 | NModel introduction
NewsReader NModel example | nmodel
- Basic introduction in the NModel web
- NModel Reference Manual
- Follow installation instruction of NModel (but please download the NModel tool here, and compile it with Visual Studio to build it, if you are bold enough to hack it through).
- Optional book: Model-based Software Testing and Analysis with C#
MP3: due Nov 16 Th 11:59pm Champaign Time |
| 11/19 | Term Project - Midterm Milestone: due Nov 17 Friday, Nov 19 Sunday, Nov 21 Tuesday 11:59pm Champaign Time |
| 11/30 | NModel introduction
NewsReader NModel example | nmodel |
| 12/05 | Technical writing | writingissues
The Pyramid Principle
MP4: due Dec 5 Tu 11:59pm Champaign Time |
| 12/07 | Technical writing - cont. | writingissues
Checklist for Preparing Camera-Ready Versions
Advice Portal |
| 12/13 | Term Project - Final: due Dec 13 Wed Dec 15 Fri 11:59pm Champaign Time |