



My Life with Bugs, or, Why I Believe in Combinatorial Testing

by: Dr. Paul E. Black



Tuesday, October 30, 2007

The American Society for Quality (ASQ) — Washington, DC & Maryland Metro Section
Software Special Interest Group (SSIG)
and
Society for Software Quality (SSQ), Washington, DC Area Chapter

This presentation will describe the benefits of combinatorial testing. Trying all combinations of inputs or program settings is impossible for most programs. However research shows that trying all pairs, all triples, all 4-way, up to 6-way combinations of parameters catches most bugs. Theoretically a relatively small number of tests can exercise all k-way combinations since a single execution exercises on the order of p^k k-way combinations, where p is the number of parameters. Recent algorithms have been able to quickly find a packing of all k-way combinations into a relatively small number of tests.



Dr. Black has nearly 20 years of industrial experience in areas such as developing software for integrated circuit design and verification, assuring software quality, and managing business data processing. The web site he began and edits, the on-line Dictionary of Algorithms and Data Structures, (<http://www.nist.gov/dads/>) is accessed almost 20,000 times a day from all over the world. He currently leads the Software Assurance Metrics And Tool Evaluation (SAMATE <http://samate.nist.gov/>) project. Dr. Black has published in the areas of software testing, software configuration control, networks and queuing analysis, formal methods, software verification, quantum computing, and computer forensics. He is a member of ACM, IEEE, and the IEEE Computer Society.

This Meeting Will Be Held at 4 Locations! New location – at NIST!

MITRE, room 0N136
7515 Colshire Drive
McLean, VA 22102

MITRE, room 1002
260 Industrial Way
West
Eatontown, NJ 07724

MITRE, room 1M306
202 Burlington Rd.
(Rt. 62)
Bedford, MA 01730

NIST, Lecture Room F
100 Bureau Dr.
Gaithersburg, MD,
20878***

The four locations will be linked using video tele-conferencing (VTC) facilities.

***To RSVP for NIST, please indicate your US citizenship status.
If not a US citizen, please provide your title, employer, and address.

Software SIG Chairman: T. Scott Ankrum – member ASQ

Software SIG Committee: Chris Jones – member SSQ and ASQ

Richard Eng – member ASQ

Tim Rice

Ben Walther

Alfred Kromholz – member SSQ

Sponsored Jointly By: The American Society for Quality (ASQ), Washington DC & Maryland Metro Section (509), Software Special Interest Group (SSIG) and Society for Software Quality (SSQ), Washington, DC Area Chapter. Members of the ASQ SSIG include software quality professionals, software engineers, and others interested in applying quality principles to the field of software development. See our web page: <http://www.asq509.org/ht/d/sp/i/2499/pid/2499>
We meet every month, usually at the MITRE facility in Tyson's Corner, Virginia, with VTC to other locations. If you can host another location via VTC, please contact Scott Ankrum.

Registration:

Please register for the meeting by **noon** Monday, October 29th, 2007 by contacting Scott Ankrum at ankrums@mitre.org or 703-983-6127 for the Virginia, Maryland and Massachusetts sites, or contact Richard Eng at 732-578-6352 or reng@mitre.org for Eatontown, NJ. Please include your company affiliation, your citizenship, and the location you plan to attend. You do not need to be an ASQ member to attend.

**Pizza and soda will be served. There is no cost to attend at McLean and Gaithersburg.
A monetary contribution is requested at Eatontown and at Bedford.**

The Meeting Is Scheduled For:

Tuesday, October 30th, 2007
6:30 - 7:00 Pizza and Sodas
7:00 - 8:00 Program

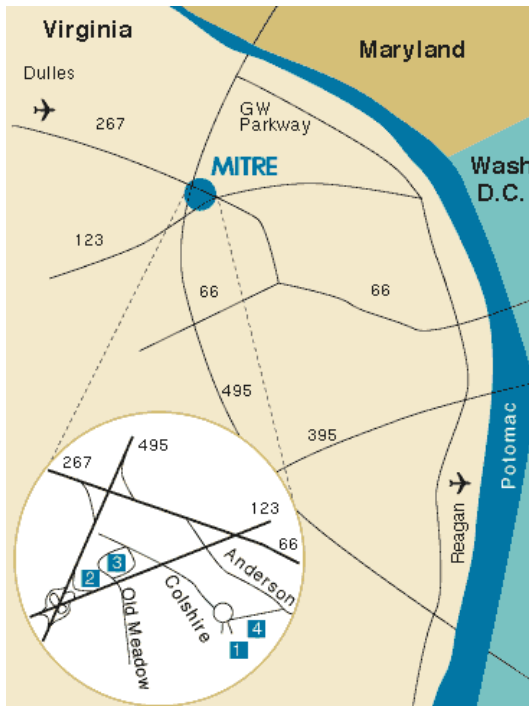
Will Be Held At:

MITRE building 2 room 0N136, Mclean, VA
MITRE room 1002, Eatontown, NJ
MITRE building M room 1M306, Bedford, MA
[NIST, Lecture Room F, Gaithersburg, MD](#)

If you cannot be at any of these locations, ask about the telephone conference call number.

Directions to the MITRE Facility in McLean, Virginia:

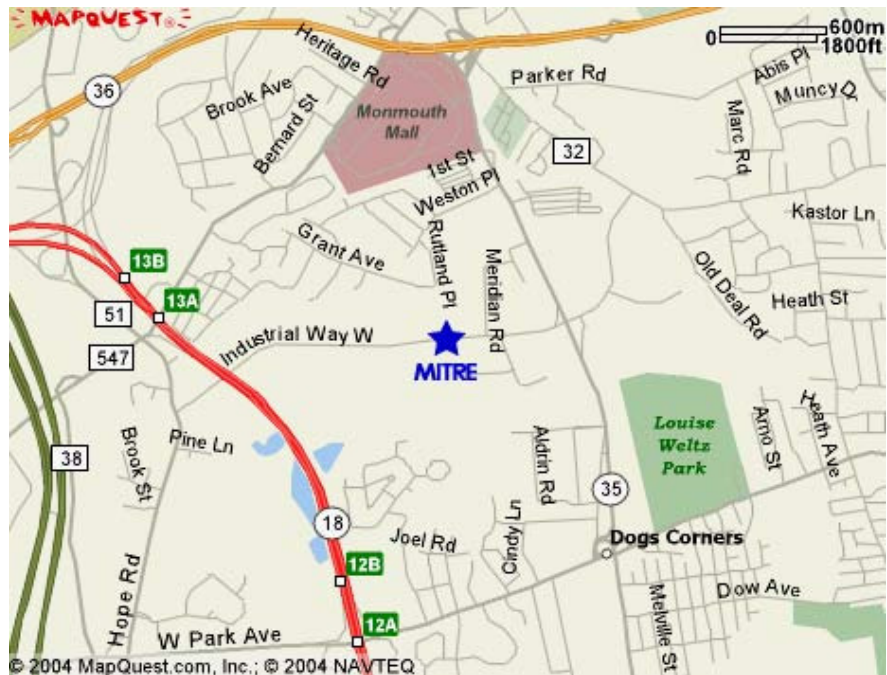
Take the Beltway, I-495 to Virginia. Take Exit 46B (McLean, Route 123). Take Route 123 North, (also called Dolley Madison Blvd.) and go to the second traffic light at Colshire Drive. Turn right on Colshire Drive and continue through circle on Colshire. **Park in front of or to the right of the buildings, before passing the gate. (The gates are closed at 7:00)** Additional directions can be found at: http://www.mitre.org/about/locations/mitre1_map.html



Directions to the MITRE Facility in Eatontown, New Jersey:

From the New Jersey Turnpike

If traveling from the **SOUTH**, get off the Turnpike at Exit 7A (195 toward Shore Points). Take 195 East towards the ocean and shortly after 195 turns into Route 138 (approximately 35 miles) watch for Route 18 North (Eatontown). Take Route 18 North to Exit 13A (Wayside West/Wyckoff Road). At end of ramp, bear left. At first traffic light (Hope Road) make a left turn. Make second left turn onto Industrial Way. The MITRE Corporation is next to the First Atlantic Credit Union on the left hand side of Industrial Way. There is a MITRE sign out front.



There are two buildings on the left side of Industrial Way. The first building is MITRE, the second building is TYCO. Take a left turn into the parking lot of the first building, which is MITRE.

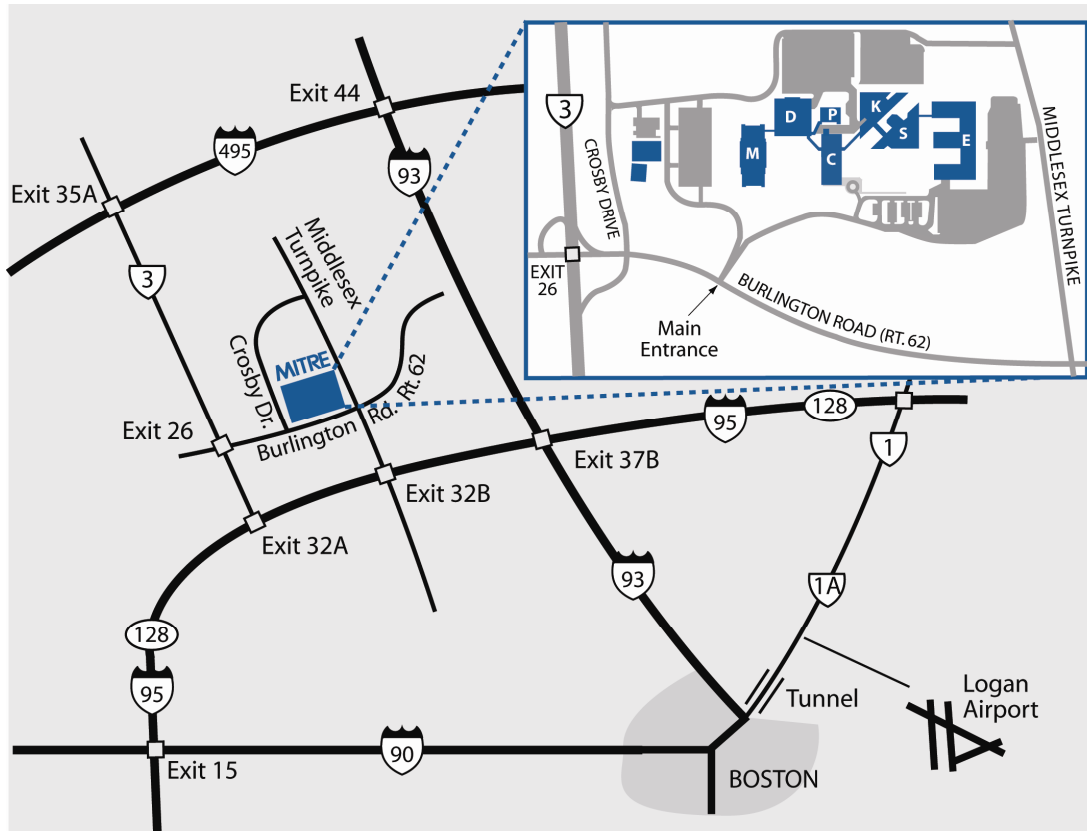
If traveling from the **NORTH**, get off the Turnpike at Exit 11 (Garden State parkway exit). Follow the Garden State Parkway until Exit 105 (Eatontown). Follow the directions from the Garden State Parkway below.

From the Garden State Parkway: Follow the Garden State Parkway from the North or from the South to Exit 105 (the exit numbers increase going from south to north). After paying the toll at Exit 105, make first right turn onto Hope Road. Follow Hope Road to Industrial Way (second left turn after crossing

Wyckoff/Shafto Road). Make second left turn onto Industrial Way. The MITRE Corporation is next to the First Atlantic Credit Union on the left hand side of Industrial Way. There is a MITRE sign out front. There are two white buildings on the left side of Industrial Way. The first building is MITRE, the second building is TYCO. Take a left turn into the parking lot of the first building, which is MITRE.

When you are facing the front of the MITRE building, the entrance to the ASQ meeting will be from the left parking lot opposite First Atlantic bank. Follow the signs to the conference room.

Directions to the MITRE complex in Bedford, Massachusetts:



From New Hampshire to MITRE Complex:

Take Route 3 South to Exit 26 (Route 62)

Turn Left on Route 62. It is a short distance to the MITRE entrance on left--watch for building directories on MITRE grounds

From Manchester Airport (NH) to MITRE Complex:

Start out going West on Airport Rd. toward parking

Turn slight right onto Brown Ave/NH-3A

Merge onto NH-101 West via the ramp on the left toward Bedford/Nashua

Take the Everett Turnpike South exit toward Merrimack/Nashua

Merge onto Everett Turnpike (toll road)

Everett Turnpike becomes US-3 South

Take exit 26 (Route 62) toward Bedford/Burlington

Turn Left onto (Route 62) Burlington Road

At second set of traffic lights, turn left at MITRE Bedford Campus entrance--watch for building directories on MITRE grounds.

Logan Airport to MITRE Complex:

Exit airport towards Route 1A South/Sumner Tunnel (I-93) Boston.

Proceed through tunnel towards Storrow Drive (I-93 North).

Take I-93 North eleven miles to Exit 37B (Route 128 (I-95) South).

Take Route 128 (I-95) South six miles to Exit 32A.

Take Exit 32A, and proceed on Route 3 North.

Take Route 3 North for two miles to Exit 26 (Route 62).

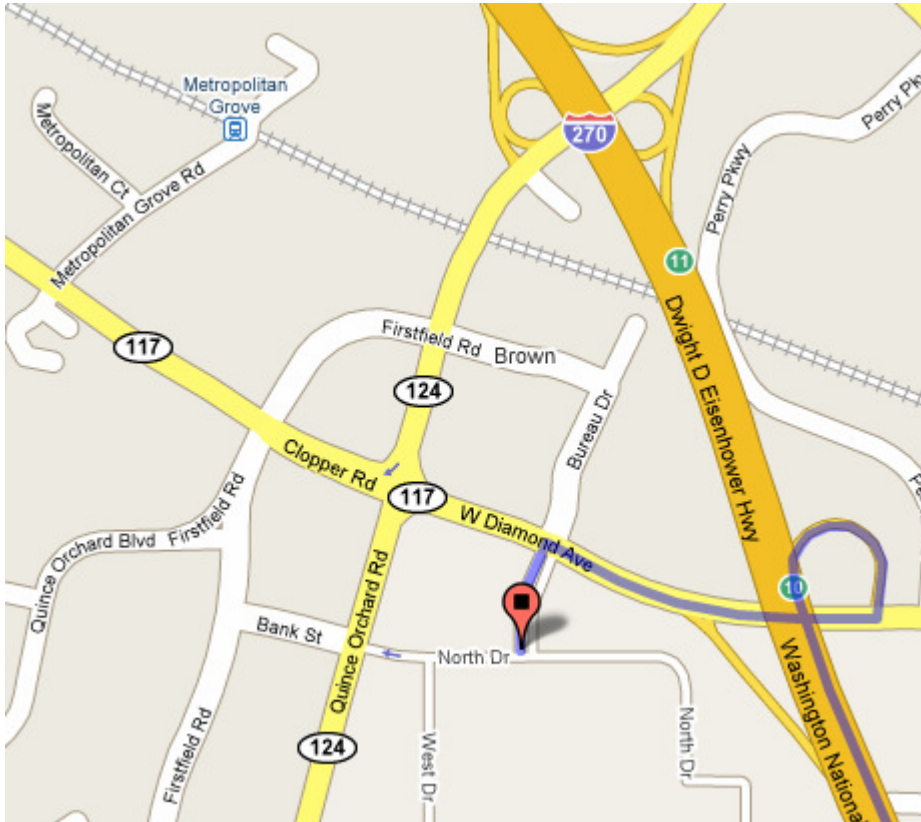
Bear right on Route 62.

Take Route 62 a short distance to the MITRE Bedford Campus entrance on left--watch for building directories on MITRE grounds.

Directions to the NIST facility in Gaithersburg, MD:

From northbound I-270 take Exit 10, Route 117 West, Clopper Road. Bear right at the first light onto Clopper Road/West Diamond Avenue. At the next light, turn left onto the NIST grounds.

From southbound I-270 take Exit 11, Route 124, Montgomery Village Avenue/Quince Orchard Road. Bear right at the first light onto Route 124 West, Quince Orchard Road. After you merge onto Rt. 124, Quince Orchard Road, turn left at the second light onto Route 117, West Diamond Avenue. Turn right at the first light onto NIST grounds.



Get visitor's badge from guard in gatehouse. Park in main lot (red line), and enter Administration building. Follow signs to lecture room F, which is downstairs at the far corner of the building.

