Variability vs. Repeatability

An Experience Report

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This talk is about my experience in adding some variability to automated testing and what I learned about it.
My Historical Approach To Testing

**Manual Testing**
*known inputs and expected outputs*

**Automated Testing**
*automating the manual tests*

**Exploratory**
*no fixed inputs and adapt tests*

**Automated Testing with variability**
EXAMPLES
Example 1

Get all the hotels in a given city
Example 1

Get all the hotels in a given city

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All Destinations
- USA & Canada
  - Northeast
  - Southeast

Hotel Max
- Hip Seattle Hotel Brimming with Local Art
- $229 from $89/night
Example 1

Get all the hotels in a given city
Example 2

Get the details of a given hotel
METHODOLOGY
Previous Methodology

Data driven testing

*expected inputs matched with expected outputs*
Implemented Methodology

```
01 testGetHotelDetails() {
02    // Get 10 random hotels
03    List<Hotel> hotels = DBWrapper.getRandomHotel(10);
04    foreach (Hotel hotel in hotels) {
05        Response response = HttpClient.getHotels(hotel);
06        Hotel hotelReturned = new Hotel(response);
07        Oracle.assertEquals(hotel, hotelReturned);
08    }
09 }
```
Implemented Methodology

```java
01 testAllHotelsBelongInRegion() {
02   // Get 10 random regions
03   List<Region> regionsToTestWith = DBWrapper.getRandomRegion(10);
04   foreach (Region region in regionsToTestWith) {
05       Response response = HttpClient.getHotelsInRegion(region);
06       Oracle.assertVerifyHotelsBelongInRegion(response, region);
07   }
08 }
```
OBSERVATIONS
Time

Initial construction took longer

Creating test cases could be faster and up to 3 times slower

Maintenance of tests is generally easier and faster
Bugs

About \textbf{10\%} more bugs found

Majority of these bugs were \textit{low priority}

Majority of the these were also \textbf{real data issues}
Confidence

Hard to measure

Test team felt more confident

*not testing the same data*  
*over and over again*

*tested more permutations*  
*than I can in a lifetime*
Comparison

**Variability**
- Uncover more bugs
- Easier to maintain
- Generates more confidence
- Tests more variations
- Good for large data sets

**Repeatability**
- Faster to develop initially
- Lower coding bar
- Predictable
Criticisms

Lack of repeatability and predictability

Duplicating feature work

Testing the tests
Future work

Add ease of repeatability

Replay based on logs or test session id with a seed

Adaptable tests

Use machine learning and statistical analysis to allow tests to explore areas on its own
Thank you.

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