GUAVA

GOOGLE CORE LIBRARIES FOR JAVA 1.6+

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What to expect

* Intro: Complements Jakarta Commons Lang, Collections. Notice the “s” at the end of class names.
* Objects, Splitter, Joiner, Throwables, Preconditions, ...
* Ints, Longs, ...
* Lists, Maps, Sets, Multimap, ImmutableList/Map
* Predicate, Function, (closures)
* Hashing, Caching

Objects - equals, hashCode

```
public boolean equals(Object obj) {
   if (obj instanceof Phone) {
      Phone that= (Phone) obj;
      return Objects.equal(this.areaCode, that.areaCode)
          && Objects.equal(this.local, that.local)
          && Objects.equal(this.ext, that.ext);
   }
   return false;
}

public int hashCode() {
   return Objects.hashCode(areaCode, local, ext);
}
// Look at Phone.java
```

Objects - toString

```
public String toString() {
   return Objects.toStringHelper(this)
      .add("street", street)
      .add("city", city)
      .add("state", state)
      .add("zip", zip)
      .toString();
 }

// Look at Address.java
```

Splitter, Joiner

```
@Test public void splitJoin() {
  String text = "a,b,,c, d, e ";
  Iterable<String> split=Splitter.on(",")
    .omitEmptyStrings().trimResults()
    .split(text);
  String joined=Joiner.on(".").join(split);
  assertEquals("a.b.c.d.e", joined);
}

// Look at WhateverTest.java
```

Throwables

```
List<Throwable> getCausalChain(Throwable throwable)
Throwable getRootCause(Throwable throwable)
String getStackTraceAsString(Throwable throwable)
```

```
@Test(expected=RuntimeException.class)
public void throwables() {
  try {
    throw new Exception();
  } catch (Exception e) {
    throw Throwables.propagate(e);
  }
}
// Look at WhateverTest.java
```

Preconditions

```
private int field=-1;

void pre(int age, String name) {
  Preconditions.checkArgument(age>0 && age<120,
                "Invalid age"); // IllegalArgumentException
  Preconditions.checkNotNull(name,
                "name must have a value"); // NPE
  Preconditions.checkState(field>0); // IllegalStateException

  // now do whatever
}

// Look at WhateverTest.java
```

Ints

```
@Test public void testInts() {
    int[] a= {1, 2};    int[] b= {3, 4};
    int[] con = Ints.concat(a, b);
    int[] expected= {1, 2, 3, 4};
    assertArrayEquals(expected, con);
    assertFalse( Ints.contains(con, 10) );
    assertEquals(2, Ints.indexOf(con, 3));
    assertEquals(2, Ints.lastIndexOf(con, 3));

    assertEquals(9, Ints.max(1, 4, -1, 9, 3));
    assertEquals(-1, Ints.min(1, 4, -1, 9, 3));

    List<Integer> list= Lists.newArrayList(1, 2, 3, 4);
    int[] arr= Ints.toArray(list);
    assertArrayEquals(expected, arr);
}
// Look at IntsTest.java
```

Lists

Creating an instance does not require repeating the generics types as in:

```
List<String> list=new ArrayList<String>();
```

```
@Test public void testLists() {
  List<String> list= Lists.newArrayList
                        ("a", "b", "c", "d", "e");
  List<List<String>> parts= Lists.partition(list,3);
  assertEquals(2, parts.size());
  List<String> ed = Lists.reverse(parts.get(1));
  assertEquals(Lists.newArrayList("e", "d"), ed);
}
// Look at ListsTest.java
```

Maps, Sets

Maps:

newHashMap(), newLinkedHashMap(), newTreeMap(), ...

Sets:

Set<Integer> set= Sets.newHashSet(1, 2, 3);

cartesianProduct(), complementOf(), difference(), intersection(), union()

Look at MapsTest.java and SetsTest.java

Multimap

Similar to Map but associates multiple values with a single key

```
@Test public void testMap() {
  Multimap<Integer, String> map=
                    ArrayListMultimap.create();
  map.put(1, "a");
  map.put(2, "b");
  map.put(1, "c");
  assertEquals(Lists.newArrayList("a","c"),map.get(1));
  assertEquals(Lists.newArrayList("b"), map.get(2));
}

// Look at MapsTest.java
```

ImmutableList

Similar to Collections.unmodifiableList()

```
@Test public void testImmutableList() {
  List<Integer> list1= ImmutableList.of(1, 2, 3);
  List<Integer> list2=ImmutableList.<Integer>builder()
     .add(10)
     .add(11, 12)
     .addAll(list1)
     .build();
  assertEquals(ImmutableList.of(10,11,12, 1, 2, 3),
                  list2);
}
// Look at ListsTest.java
```

ImmutableMap

```
@Test(expected=UnsupportedOperationException.class)
public void testImmutableMap() {
  Map<Integer,String> map1=ImmutableMap.of(1,"a",2,"b");
  Map<Integer,String> map2=
      new ImmutableMap.Builder<Integer, String>()
       .put(3, "c")
       .put(4, "d")
       .putAll(map1)
       .build();
  assertEquals(4, map2.size());
  map2.put(10, "x");
}
```

Predicate

Determines a true or false value for a given input. Useful with filters.

```
interface Predicate<T> {
  boolean apply(T input);
  // ...
}
```

Look at PredicateTest.java

Function

Determines an output value based on an input value.

Useful with transformers

```
interface Function<F, T> {
   T apply(F input);
   // ...
}
```

Look at FunctionTest.java

Filter/Transform

Iterables

<T> Iterable<T> filter(Iterable<T> unfiltered, Predicate<T> predicate);

<F,T> Iterable<T> transform(Iterable<F> from, Function<F, T> function);

So anything in Java that's iterable, you can filter or transform it.

Closures

```
<T> T execute(Function<Connection,T> closure) {
  Connection con= getConnection();
  try {
    return closure.apply(con);
  } finally {
    closeConnection(con);
  }
}
```

Look at WithConnection and PhoneDao

Hashing MD5, SHA, MUR, ...

```
HashFunction hashFunction= Hashing.md5();
HashCode hashCode=
hashFunction.hashString("blah blah");

System.out.println(hashCode.toString());
System.out.println(hashCode.asBytes());
```

In addition to ~~md5~~, we have goodFastHash, murmur3, ~~sha1~~, sha256, sha512

Look at HashTest.java

Caching

com.google.common.cache: CacheBuilder and LoadingCache

```
LoadingCache<String, FatAndBadObject> fatAndBadCache =
CacheBuilder.newBuilder()
   .maximumSize(1000)
   .expireAfterWrite(1, TimeUnit.HOURS)
   .build(
      new CacheLoader<String, FatAndBadObject>() {
       @Override
       public FatAndBadObject load(String key) throws Exception{
         return new FatAndBadObject(key);
       }

   });
```

Misc

* Annotations: @Beta, @VisibleForTesting
* IO: streams and files
* Concurrent
* MapMaker: Easily create cache

Last Slide

* http://code.google.com/p/guava-libraries/
* twitter @ahabra
* github.com/ahabra/guava-class
* www.tek271.com