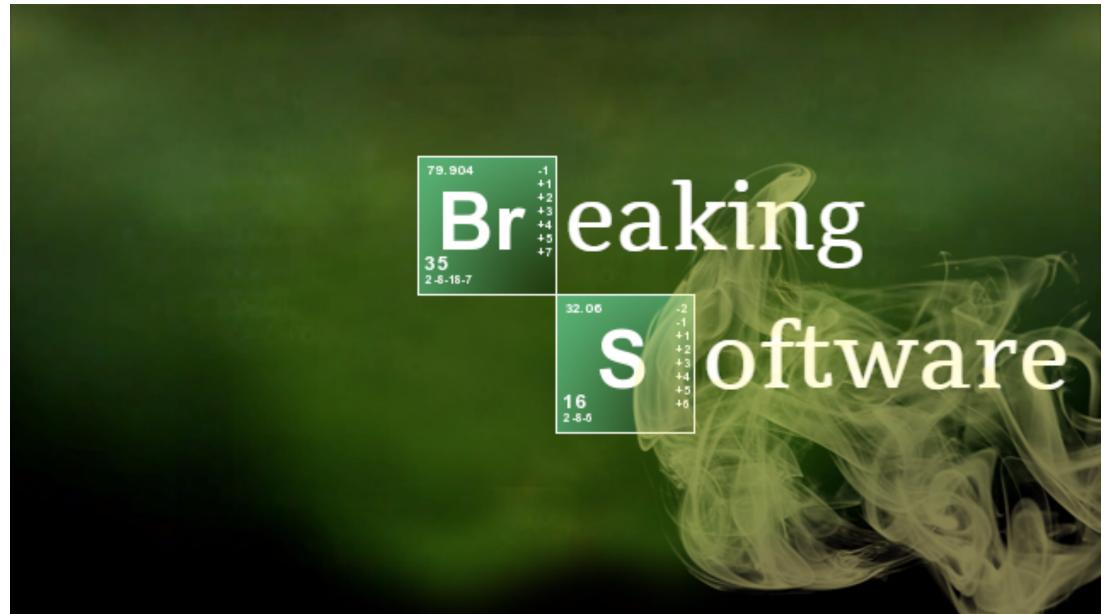
CS1632 LECTURE 5



SOFTWARE TENDS NOT TO BREAK MUCH ON THE HAPPY PATH.

- •It breaks when there's unexpected input.
- Malicious users.
- Systems going down.
- •When you're off in the wilderness.



LOGIC ERRORS: THE LOGIC OF THE PROGRAM IS INCORRECT

```
if (student.isTaking(cs1632)) {
    student.setHappy(false);
} else {
    student.setHappy(true);
}
```



OFF-BY-ONE ERROR: A SUBSET OF LOGIC ERRORS WHERE VALUES ARE SPECIFIED INCORRECTLY BY ONE UNIT

```
if (student.getNumCredits() > 120) {
    student.setCanGraduate(true);
} else {
    student.setCanGraduate(false);
}
```



ROUNDING/FLOATING POINT ERRORS: ROUNDING OR FLOATING POINT DISPLAY GIVE INCORRECT RESULTS.

```
double oneVal = 1.0 / 857.0;
double total = oneVal * 857.0;

System.out.println("Should be 1.0, actually = " + total);
boolean areEqual = (total == 1.0);
System.out.println("Are equal? " + areEqual);
```



INTEGRATION ERRORS: ERRORS AT BOUNDARIES BETWEEN SYSTEMS/ SUBSYSTEMS.

```
int startDistanceInKilometers = 14;
spacecraft.setDistance(startDistanceInKilometers);
...
public class Spacecraft
   public void setDistance(int distanceInMiles) {
        ...
}
```



ERRORS OF ASSUMPTION: THE DEVELOPER OR SYSTEM MAKES AN ASSUMPTION WHICH TURNS OUT TO BE INCORRECT, OR AT ODDS WITH OTHER ASSUMPTIONS.

```
OutputFile.write(TAB_DELIMITED);
...
InputFile.read(COMMA_DELIMITED);
```



MISSING DATA ERRORS: AN ERROR OCCURS BECAUSE NEEDED DATA IS MISSING AND THE SYSTEM CANNOT OPERATE PROPERLY WITHOUT IT.

```
public static void main(String[] args) {
    System.out.println(args[3]);
}
```



BAD DATA ERRORS: SYSTEM CANNOT HANDLE IMPROPERLY FORMATTED OR INVALID DATA.

```
Enter two numbers to divide: 7 0
Exception in thread "main"
java.lang.ArithmeticException: / by zero
```



DISPLAY ERRORS: THE DATA IS CORRECT BUT NOT DISPLAYED PROPERLY.

```
double pi = Math.PI;
System.out.printf("Pi is equal to...%.1f!",
pi);
```



NULL POINTER ERROR: THE PROGRAM DEREFERENCES A NULL POINTER.

```
String oneILove = null;
oneILove = oneILove.toUpperCase();
System.out.printf("This one goes out to
the one I love," + oneILove);
```



I/O ERRORS: THE SYSTEM ENCOUNTERS AN UNEXPECTED STATE OF DISK, NETWORK, OR OTHER I/O AND CANNOT HANDLE IT.

```
try {
    // read in file
} catch (FileNotFoundException e) {
    // AAAGH WHAT DO I DO
    System.exit(1);
}
```



CONFIGURATION ERROR: THE SYSTEM COULD WORK CORRECTLY, BUT IT WAS NOT CONFIGURED TO WORK CORRECTLY.

'javac' is not recognized as an internal or external command, operable program or batch file.



THE LIST GOES ON...

- Accessibility errors
- Domain-specific errors
- Version mismatch errors
- Distributed system errors
- Logging Errors
- Interface Errors
- Errors where the slide writer writes down an error that was already covered like say, Off-By-One Error
- Logging Errors
- Regulatory or Legal Errors



















