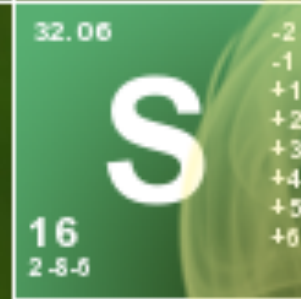


eaking



oftware

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

