# 04 Testing and Debugging

## Keyboard/Mouse Input

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## Types of Error

**Syntactic** – basic error that prevents your program from compiling, e.g. missing semicolon; typically easy to fix

**Semantic/Logical** – error that occurs after compilation and while your program is running, e.g. null pointer reference exception; typically harder to fix

### Testing

= ensuring that the classes, properties and methods in your program are all correct

[normal, boundary, error cases]

[specifiying agreed on behaviour in the comments]

### Debugging

= finding out where mistakes are in your code when your program has an error

[cascades of errors – target the FIRST error]

[add a debug flag]

[use of toString to dump to console]

[insertions of debugging code]

[HUDs in processing]