Types of Errors

Error Type	Definition	Frequency	Error message timing	Error message format	Ease of finding	Ease of fixing	Key features	Examples
Build error	An error that prevents a program from building properly.	Very Common	When building the program	- Should contain a filename and line number - Located in the output where the program was built - May contain type information	Easy	Varies depending on error message details	- Compilers will catch more or less errors depending on the programming language - Can find multiple errors at once	- incorrect variable type - wrong function parameters
Index out of bounds error	An error that is thrown when trying to access an item in a list that is shorter than the index being accessed.	Common for beginner programmers; semi-common for experienced programmers	When running the program	- Should contain filename and line number - May contain index that was being accessed - Located in the program logs	Easy	Easy	- A type of runtime error - Can be easy to find by stepping through the program - May be a result of data that does not match assumptions - Could be a logic error if the wrong index was specified	- Accessing the 6th index of a list with 5 items
Infinite loop	An error that results in a program running forever unless it is canceled.	Common for beginner programmers; rare for experienced programmers	No error message	No error message	Medium	Easy	- Can be found by checking loops in the program - Easy to find by stepping through the program	- a while loop with a condition that is always true - a for loop that does not increment the condition value - a loop missing a break or continue statement

Logic error	An error that is caused by an incorrect algorithm.	Common	No error message	No error message	Medium	Medium	- Output will not match expectations - Can narrow down incorrect logic by stepping through the program	- Mixing up the order of program statements
Missing import	An error that occurs when you try to use code from another file or class that is not properly included.	Common	While building the program	- In the output where the program was built	Easy	Easy	- A type of build error - May be highlighted before building depending on the IDEs	- Not included the Lists clas and trying to use a list
Null pointer exception	An error that is thrown when trying to access data from or call a method on an object that does not exist.	Semi-common	While running the program	- Should contain a file name and line number - May not contain which object is null - Located in the program logs	Can be hard to find where the was not created or where it was deleted	Easy	- A type of runtime error - Program will build correctly - Can be the result of not setting a value for a variable	int a; int b = 3; return a + b; Where a is never set
Out of memory (OOM)	An error that is thrown when the program runs out of space to store the objects used in the program.	Semi-common depending on the programming language	While running the program	- Does not contain information about what objects are using the memory - Located in program logs	Hard	Hard	- A type of runtime error - Program will build correctly - May run fine on some datasets but not others	- An object that is not deleted - A large data set that requires creating a lot of objects
Runtime error	An error that is thrown during the running of a program.	Common	While running the program	- Usually results in a stack track with filename and line number - May contain type information	Varies depending on the complexity of the program	Varies depending on the details available in the error message	- Can be an error that occurs every time the program is run or only under certain conditions - Program will build correctly	- Null pointer exception - Index out of bounds error - Out of memory error

Syntax error	An error in how you are writing your code.	Very Common	When building the program	- Usually located in program logs			- Will only find the first error	
				- Should contain a filename and line number - In the output where the program was built	Easy	Easy	- A type of build error - May be highlighted before building depending on the IDEs	- a misspelled word - missing semicolon - mismatched parentheses

 Build error   Runtime error   Logic error