

C++ Error Types Cheat Sheet

1. Compile-Time Errors

- Detected by compiler before program runs.

- Examples:

- * Syntax Errors (e.g., missing semicolon)

- * Type Mismatch (e.g., assigning string to int)

- * Undeclared Variable

- * Function Overloading Conflicts

Example:

```
int a = "hello"; // Error: type mismatch
```

2. Run-Time Errors

- Detected while the program is running.

- Examples:

- * Division by zero

- * File not found

- * Null pointer dereference

- * Array out of bounds

Example:

```
int x = 10, y = 0;
```

```
cout << x / y; // Error: Division by zero
```

3. Logical Errors

- Program runs but gives incorrect result due to logic flaw.

- Examples:

- * Wrong formula

- * Incorrect conditions in loops

- * Incorrect operator usage

Example:

```
int a = 5, b = 10;
```

```
cout << a + b / 2; // Logic error (should be (a + b) / 2)
```

4. Semantic Errors

- Code is syntactically correct but meaning is wrong.

- Often overlaps with logical errors.

Example:

```
Base* ptr = new Derived();
```

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```
ptr->show(); // Outputs base version unless 'show' is virtual
```

5. Memory Issues

- Common in advanced programming.
- Memory leaks from missing `delete[]` or improper memory handling.

Example:

```
int* arr = new int[100];
```

```
// No delete[] arr; causes Memory Leak
```