



Exception Handling

An exception is a problem that arises during the execution of a program. A C++ exception is a response to an exceptional circumstance that arises while a program is running, such as an attempt to divide by zero.

Exceptions provide a way to transfer control from one part of a program to another. C++ exception handling is built upon three keywords: **try**, **catch**, and **throw**.

- **throw** – A program throws an exception when a problem shows up. This is done using a **throw** keyword.
- **catch** – A program catches an exception with an exception handler at the place in a program where you want to handle the problem. The **catch** keyword indicates the catching of an exception.
- **try** – A **try** block identifies a block of code for which particular exceptions will be activated. It's followed by one or more catch blocks.

Assuming a block will raise an exception, a method catches an exception using a combination of the **try** and **catch** keywords. A try/catch block is placed around the code that might generate an exception. Code within a try/catch block is referred to as protected code, and the syntax for using try/catch as follows –

```
try {  
    // protected code  
} catch( ExceptionName e1 ) {  
    // catch block  
} catch( ExceptionName e2 ) {  
    // catch block  
} catch( ExceptionName eN ) {  
    // catch block  
}
```

Throwing Exceptions

Exceptions can be thrown anywhere within a code block using **throw** statement. The operand of the throw statement determines a type for the exception and can be any expression and the type of the result of the expression determines the type of exception thrown.

Following is an example of throwing an exception when dividing by zero condition occurs –

```
double division(int a, int b) {  
    if( b == 0 ) {  
        throw "Division by zero condition!";  
    }  
    return (a/b);  
}
```



Catching Exceptions

The **catch** block following the **try** block catches any exception. You can specify what type of exception you want to catch and this is determined by the exception declaration that appears in parentheses following the keyword **catch**.

```
try {  
    // protected code  
} catch( ExceptionName e ) {  
    // code to handle ExceptionName exception  
}
```

Above code will catch an exception of **ExceptionName** type. If you want to specify that a catch block should handle any type of exception that is thrown in a try block, you must put an ellipsis, ..., between the parentheses enclosing the exception declaration as follows –

```
try {  
    // protected code  
} catch(...) {  
    // code to handle any exception  
}
```

The following is an example, which throws a division by zero exception and we catch it in catch block.

```
#include <iostream>  
using namespace std;  
  
double division(int a, int b) {  
    if( b == 0 ) {  
        throw "Division by zero condition!";  
    }  
    return (a/b);  
}  
  
int main () {  
    int x = 50;  
    int y = 0;  
    double z = 0;  
  
    try {  
        z = division(x, y);  
        cout << z << endl;  
    } catch (const char* msg) {  
        cerr << msg << endl;  
    }  
  
    return 0;  
}
```

Because we are raising an exception of type **const char***, so while catching this exception, we have to use **const char*** in catch block. If we compile and run above code, this would produce the following result –

Division by zero condition!