Exception

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Types of Errors

- Compile time error
  - Detected at the compile time by the compiler
- Runtime errors
  - Detected by the runtime system
  - Who handles them?
  - How can your program handle them?

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Wonder?

```
class Div{
public void Main(){
int k=10;
k=k/0;
System.Console.WriteLine("hello");
}
}
```

What error do you expect to get?

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Runtime error

```
class Div{

public static void Main(){

int k=10, j=0;

k=k/j;

System.Console.WriteLine("hello");
```

```
Unhandled Exception:
System.DivideByZeroException: Attempted to
divide by zero.
at Div.Main()
```

Runtime error automatically handled by the runtime system

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Exception Handling

- Handling exception that occur at runtime in our application is exception handling.
- Handler

```
try{
// code that may throw exception
}catch(Exception e){
// handler
}
```

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Example

```
using System;
class Div{
public static void Main(){
int k=10, j=0;
try{
k=k/j;
Console.WriteLine("hello");
}catch(Exception e){
Console.WriteLine("you are attempting
  to divide by 0");
}}}
```

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try-catch blocks

- A try block is a block where error are expected to occur.
- The errors are thrown in the form of Exception object in C#.
- A catch block will have the code to handle the error.
- A try block can have one or more catch block where each catch block can handle different types of exceptions.

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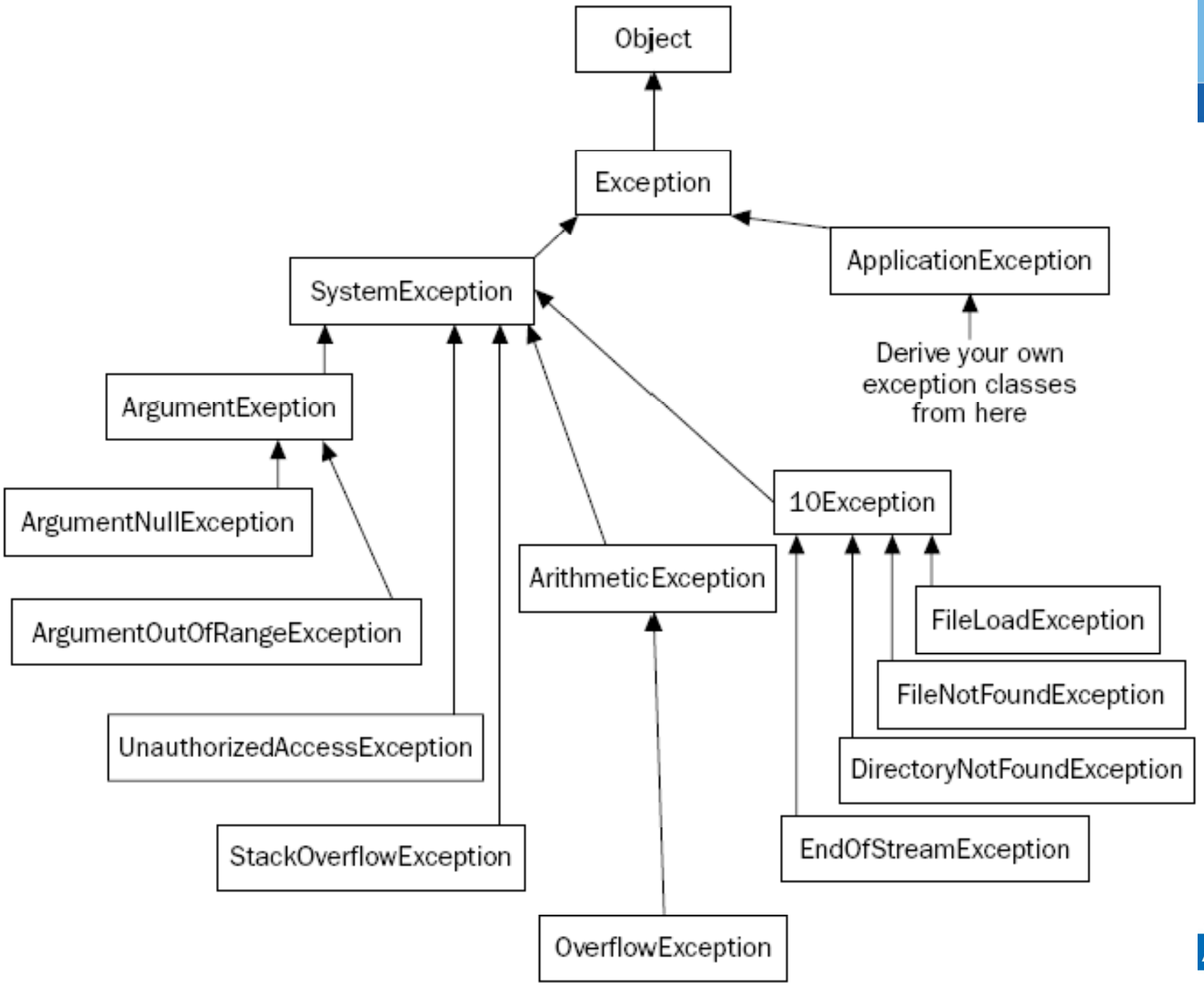
Object
Exception
SystemException
ApplicationException
Derive your own exception classes from here
ArgumentExeption
ArgumentNullException
ArgumentOutOfRangeException
UnauthorizedAccessException
StackOverflowException
ArithmeticException
OverflowException
10Exception
FileLoadException
FileNotFoundException
DirectoryNotFoundException
EndOfStreamException

Exception class members

- **`Message`**
  - Gets a message that describes the current exception.
- **`Source`**
  - Gets or sets the name of the application or the object that causes the error.
- **`StackTrace`**
  - Gets a string representation of the frames on the call stack at the time the current exception was thrown
- **`TargetSite`**
  - Gets the method that throws the current exception.

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Multiple Exception

```
using System;
class Div{
public static void Main(string[] s){
try{
int j=10;
j=j/s.Length;
int k=Int32.Parse(s[0]);
j=j/k;
Console.WriteLine("j"+j);
}catch(DivideByZeroException d){
Console.WriteLine("divide by zero "+d);
}
```

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```
catch(FormatException d){
Console.WriteLine(" not a number "+d);}

catch(Exception d){
Console.WriteLine(" general error
"+d);}
catch{
Console.WriteLine("error due to code
outside the system");}
}}
```

for objects which thrown are not of Exception type → In cases where you invoke a method written in a language that can throws object others than the Exception type.

The catch handler sequencing is important. The subclasses objects must be caught before the super class.

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finally

- try block can have finally block as well apart from the catch block.
- finally block will execute whether or not an exception occurs.
- It is provided so that clean up code could be written in all cases whether an error occurs or not like closing of a file, database connection etc.
- In C#, a try block must be followed by either a catch or finally block .

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```
using System;
class Div{
public static void Main(string[] s){
try{
int j=10;
j=j/s.Length;
int k=Int32.Parse(s[0]);
j=j/k;
Console.WriteLine("j"+j);
}catch(DivideByZeroException d){
Console.WriteLine("divide by zero "+d);}
catch(FormatException d){
Console.WriteLine(" not a number "+d);}
catch(Exception d){
Console.WriteLine(" general error "+d);}
finally { Console.WriteLine("Finally Block"); }
 Console.WriteLine("Bye");
}}
```

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What do you notice?

- Executing
  - **F:\..\Slide Examples\6. Exception>Arg**

```
divide by zero
System.DivideByZeroException:
Attempted to divide by zero.
at Div.Main(String[] s)
Finally Block
Bye
```

  - **F:\Materials\My version\Dot Net Material\C# Material\Slide Examples\6. Exception>Arg 78**

```
j0
Finally Block
Bye
```

Note that both Finally Block and Bye are printed in both the cases

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Throwing an exception

- it is possible to throw an exception explicitly from code.
- **`throw excepobject;`**
- ***`Or`***
- **`throw new ArgumentException("wrong arguments");`**

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Types of exception

- Standard Exception
  - Exception thrown by the CLR
  - CLR throws objects of type **`SystemException`**
- Application Exception
  - thrown by a user program rather than the runtime.
  - Inherits from **`ApplicationException`**

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Application exception

```
using System;
class AgeException :
  ApplicationException{
string s;
 public AgeException(string str) {
   s=str +" is invalid age. Should be
   between 1 and 100";
  }
public override string ToString(){
return s;
}
}
```

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```
class Test{
 public static void Main() {
   try
   {
    Console.WriteLine("enter age");
    string s=Console.ReadLine();
    int num = Int32.Parse(s);
      if(num<1 || num>100)
      throw new AgeException(s);
   }
   catch(AgeException  e) {
    Console.WriteLine (e);
   }
   }
}
```

What will happen if enter a alphabets instead of number for age?

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