Foundations of Computer Science Exceptions and error handling

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During a computation, what if something goes wrong?

3	/	0	(*	division	by	zero	*)
---	---	---	----	----------	----	------	----

hd [] (* pattern matching falure *)

Exception handling allows us to recover from these.

Raising an exception abandons the current expression

```
raise Failure
```

Handling the exception attempts an alternative

try f () with Failure -> g ()



In[1]:	
In[2]:	
In[3]:	



In[1]:	exception	Failure
In[2]:		
In[3]:		



In[1]:	exception Failure
Out[1]:	exception Failure
In[2]:	
In[3]:	



In[1]:	exception	Failure			
Out[1]:	exception	Failure			
In[2]:	exception	NoChange	of	int	
In[3]:					



In[1]:	exception	Failure		
Out[1]:	exception	Failure		
In[2]:	exception	NoChange	of	int
Out[2]:	exception	NoChange	of	int
In[3]:				



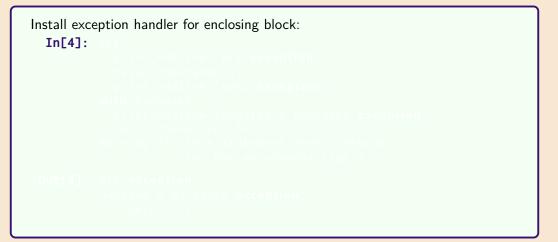
In[1]:	exception	Failure		
Out[1]:	exception	Failure		
In[2]:	exception	NoChange	of	int
Out[2]:	exception	NoChange	of	int
In[3]:	raise Failure			



In[1]:	exception	Failure
Out[1]:	exception	Failure

- In[2]: exception NoChange of int
- Out[2]: exception NoChange of int
 - In[3]: raise Failure
 - **Out:** Exception: Failure.







```
Install exception handler for enclosing block:
  In[4]: try
            print_endline "pre exception";
            raise (NoChange 1);
            print_endline "post exception";
          with NoChange _ ->
            print_endline "handled a NoChange exception"
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          Line 3, characters 5-23:
          Warning 21: this statement never returns
                      (or has an unsound type.)
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         Line 3, characters 5-23:
          Warning 21: this statement never returns
                      (or has an unsound type.)
Out[4]: pre exception
          handled a NoChange exception
          -: unit = ()
```







```
In[5]: exception Change
Out[5]: exception Change
 In[6]: let rec change till amt =
          match till, amt with
           | _, 0 -> []
           [ [], _ -> raise Change (* Backtrack *)
           c::till, amt ->
                   if amt < 0 then raise Change (* Backtrack *)</pre>
                   else
                     try (* Attempt the solution *)
                         c :: change (c::till) (amt - c)
                     with Change ->
                         (* Remove some change and retry if stuck *)
                         change till amt
```

Out[6]: val change : int list -> int -> int list = <fun>

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change [5; 2] 6

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