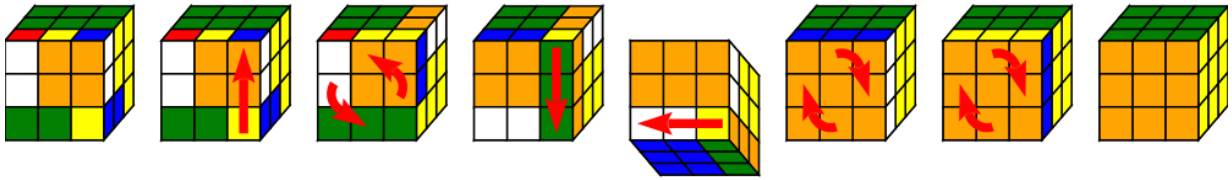
Lenses und Zauberwürfel



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Wo kann ich mehr über `lens` erfahren?

- **Das Lens-Wiki:** `https://github.com/ekmett/lens/wiki`
- Blogserie “Lens over Tea” `http://artyom.me/lens-over-tea-1`
- Vortrag von Simon Peyton Jones bei Skills Matter
- Blogpost: “Program imperatively using Haskell lenses”
- School of Haskell: “A Little Lens Starter Tutorial”
- Cheat Sheet für `Control.Lens`:
  `https://github.com/anchor/haskell-cheat-sheets`

http://timbaumann.info/lens
https://github.com/timjb/presentations/tree/gh-pages/lens

Plated

Plated

```haskell
data Inline
  = Str String
  | Emph [Inline]
  | Math MathType String
  | Link [Inline] Target
  | Image [Inline] Target
    ...
  deriving (..., Typeable, Data, Generic)

data Block
  = Para [Inline]
  | BlockQuote [Block]
  | BulletList [[Block]]
  | Header Int Attr [Inline]
    ...
  deriving (..., Typeable, Data, Generic)

data Pandoc = Pandoc Meta [Block]
  deriving (..., Typeable, Data, Generic)
```

Anwendung: Ausnahmebehandlung

```
class (Typeable e, Show e) => Exception e where ...
data SomeException = forall e. Exception e => SomeException e
handle :: Exception e => (e -> IO a) -> IO a -> IO a

handle (\(exc :: AssertionFailed) -> return "caught")
       (assert (2+2 == 3) (return "uncaught"))
⇝ "caught"

handle (\(exc :: AssertionFailed) -> return "caught")
       (assert (2+2 == 4) (return "works"))
⇝ "works"
```

Es ist doof, dass man das Argument im Exception-Handler mit einem Typ annotieren muss. Doch zum Glück gibt es `Control.Exception.Lens`!

Anwendung: Ausnahmebehandlung

```
import Control.Exception.Lens
catching :: MonadCatch m => Prism' SomeException a
         -> m r -> (a -> m r) -> m r

catching _AssertionFailed (assert (2+2 == 3) (return "uncaught"))
                          (const (return "caught"))
⇝ "caught"

catching _AssertionFailed (assert (2+2 == 4) (return "works"))
                          (const (return "caught"))
⇝ "works"
```

In `Control.Exception.Lens` sind ganz viele `Prisms` vordefiniert:

```
_IndexOutOfBounds :: Prism' SomeException String
_StackOverflow    :: Prism' SomeException ()
_UserInterrupt    :: Prism' SomeException ()
_DivideByZero     :: Prism' SomeException ArithException
_AssertionFailed  :: Prism' SomeException String
-- (usw)
```