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# Haskell

Group - B  
Software Architecture

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# What is Haskell?



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- Haskell is a standardized general-purpose purely functional programming language.
  - Non-Strict Semantics
  - Strong Static Typing
  - Lazy Evaluation
  - Pattern Matching
  - List Comprehension
  - Type Classes
  - Type Polymorphism
- Functional Programming Paradigm:
  - Treats computation as evaluation of mathematical functions.
  - Avoids change-state and mutable data

# Haskell Examples



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Hello World

```
module Main where
```

```
main :: IO ()
```

```
main = putStrLn "Hello, World!"
```

Factorial

```
factorial :: (Integral a) => a -> a
```

```
factorial n | n < 2 = 1
```

```
factorial n = n * factorial (n - 1)
```

REST GET METHOD USING SNAP

```
todoRoutes :: [(B.ByteString, Handler b TodoService  
())]  
todoRoutes = [("/", method GET getTodos)]
```

```
getTodos :: Handler b TodoService ()  
getTodos = do  
  todos <- query_ "SELECT * FROM todos"  
  modifyResponse $ setHeader  
    "Content-Type" "application/json"  
  writeLBS . encode $ (todos :: [Todo])
```

# How to Install haskell



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- Minimal Installers
  - GHC compiler
  - Build Tools
- Slack
  - Slack Global Commands
  - Build tool to download and manage haskell dependencies
- Haskell Platform
  - Recommended form to download Haskell



# How to use Haskell



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- Open Terminal and Type ghci

```
haskell — ghc -B/Library/Frameworks/GHC.framework/Versions/8.0.2-x86_64/usr/...
ghc -B/Library/Frameworks/GHC.framework/V...ns/8.0.2-x86_64/usr/lib/ghc-8.0.2 --interactive
[mbp-de-neill:haskell neillgiraldo$ ghci
GHCi, version 8.0.2: http://www.haskell.org/ghc/  :? for help
Prelude> ]
```

- Code away

```
haskell — ghc -B/Library/Frameworks/GHC.framework/Versions/8.0.2-x86_64/usr/...
ghc -B/Library/Frameworks/GHC.framework/V...ns/8.0.2-x86_64/usr/lib/ghc-8.0.2 --interactive
[mbp-de-neill:haskell neillgiraldo$ ghci
GHCi, version 8.0.2: http://www.haskell.org/ghc/  :? for help
[Prelude> fac n = if n == 0 then 1 else n * fac (n-1)
[Prelude> fac 20
2432902008176640000
[Prelude> putStrLn "I program in Haskell like a boss"
I program in Haskell like a boss
Prelude> ]
```

# How to use Haskell?



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- Compile

```
haskell — -bash — 80x24
/Users/neillgiraldo/Documents/Semester 11/haskell — -bash
[mbp-de-neill:haskell neillgiraldo$ ghc -o hello hello.hs
[mbp-de-neill:haskell neillgiraldo$ ]
```

- Execute

```
haskell — -bash — 80x24
/Users/neillgiraldo/Documents/Semester 11/haskell — -bash
[mbp-de-neill:haskell neillgiraldo$ ghc -o hello hello.hs
[mbp-de-neill:haskell neillgiraldo$ ./hello
Hello World
[mbp-de-neill:haskell neillgiraldo$ ]
```

# Haskell Best Practises



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- Functions should be short and sweet, and do just one thing.
- The code should be succinct (though not obfuscated), readable and easy to maintain (after unforeseeable changes)
- Respect Warnings and Follow hints



# Haskell and Web Development



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- Snap Framework - Well-documented and fast HTTP library
- WebAPI - Write web/REST API services

# Haskell Testing



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- QuickCheck: Automatic Testing for Haskell
  - Random testing
  - <https://hackage.haskell.org/package/QuickCheck>
- Hspec : Testing Framework for Haskell
  - Friendly DSL
  - Parallel test execution
  - Integration to QuickCheck
  - <http://hspec.github.io/>

# Bibliography

- <https://www.haskell.org/>
- [https://wiki.haskell.org/Haskell\\_in\\_5\\_steps](https://wiki.haskell.org/Haskell_in_5_steps)



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Thank you!