Functional programming, Seminar No 1

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General words on Haskell

- The language is named after American logician Haskell Curry
- First implementation: 1990
- The language standard: Haskell2010
- Default compiler: Glasgow Haskell compiler
- Haskell is a strongly-typed, polymorphic, and purely functional programming language

GHC

- GHC is a default Haskell compiler as we told above
- GHC is an open-source project. Don't hesistate to contribute!
- GHC is mostly implemented on Haskell
- GHC development is produced under the GHC Steering committee control
- Very roughly, compiling pipeline is arranged as follows:
  parsing $\Rightarrow$ compile-time (type-checking) $\Rightarrow$ runtime (program execution)

GHCi

- GHCi is a Haskell interpreter based on GHC.
- One may run GHCi with a quite simple command `ghci` on a shell
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Cabal

- Cabal is a system of library and dependency management

The Haskell Platform installation

There are several ways to install the Haskell platform on Mac:

- Download the `.pkg` file
- Run the script `curl -sSL https://get.haskellstack.org/ | sh`
- Install ghc, stack, and cabal via Homebrew

Choose any way you prefer. All those ways are equivalence to each other.

I'm a Mac user, but I believe that you'll manage to install the Haskell Platform on NixOs/Windows/Linux.

Stack

- Stack is a cross-platform build tool for Haskell projects
- Stack allows one to
  - install packages and version of GHC (and their concrete versions) you need
  - build, execute, and test projects
  - reproduce builds
  - create an isolated location

Snapshots

- Snapshot is a curated package set used by Stack
- Stackage is a stable repository that stores snapshots
- Resolver is a reference to a required snapshot
- Let us take a look at the screenshot from Stackage:
  TODO: insert a screenshots

Creating a Haskell project via Stack

- Figure out how to call your project and run the script `stack new <projectname>`
- You will see the following story after `ls` in the project directory:
  TODO: insert a screenshot

stack.yaml

Let us discuss dependencies files in a Haskell project. First of all, we observe the stack yaml file:
TODO: insert a screenshot

package.yaml

Cabal files

Building and running a project

The following commands are crucially important:

- `stack build`
- `stack run`
- `stack exec`
- `stack ghci`
- `stack clean`

Hackage

According to its description, 'Hackage is the Haskell community's central package archive of open source software'.

- Webpage: `https://hackage.haskell.org`
- Browsing packages
- Simplified package search
- Current uploads

TODO: screenshot

Hoogle

Hoogle is a sort of Haskell search engine. Webpage: `https://hoogle.haskell.org`.
TODO: screenshot

Summary