Setting up a
functional
application

The
INFDEV@HR
Team

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The INFDEV@HR Team

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Introduction

Lecture topics

- Types definition
- Initial state
- Visualisation
- Traversal and update

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Designing a functional application

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Idea

- We begin by designing the types of our application
- We give their first instance
- We then move on to the fundamental visualisation aspects to achieve a minimum level of debuggability
- We slowly add the dynamics of the program

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Defining the types

From what?

We start from a sketch of what the application should do, for example a picture on paper of an asteroid shooter game.

The sketch of an asteroid shooter game contains:

- The player ship
- The number of lives left
- The asteroids on screen

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The sketch of an asteroid shooter game contains:

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These become the fields of the `GameState` record.

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Unions come into play when things might have multiple shapes

- The current player weapon, which is either a single or double gun
- ...

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Demo

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First instance

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Having the types, we give the initial instance of the program
state.

Usually this is a "zero" instance, with mostly safe values.

Having the types, we give the initial instance of the program
state.

Usually this is a "zero" instance, with mostly safe values.

The application still does nothing, but at least everything
should compile and run.

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Demo

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Visualisation

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To be able to debug our application, we need to visualise the
state.

We add a print/show routine to our data. If it is graphical it is
better, but text is also fine.

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Demo

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Traversal and update

Traversal and update

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We now traverse and update the game state.

At every frame/main iteration we will, in turn:

- Read input events in a buffer
- Go through every element of the game state
- Compute its *next value* (by also looking at the input)
- Build the next state from all the *next values*

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Main loop

As many times as needed, we perform this update routine,
visualise the state, and repeat.

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Try it out!

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Your turn.

Use F# or Haskell, the principles remain the same.

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The best of luck, and thanks for the attention!