Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

Week 1
Refresher on Haskell

CS4012
Topics in Functional Programming

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Haskell refresher

- Last year in CS3016 you learned to program using "Haskell"
- A quick reminder of what makes Haskell different and interesting

- Haskell is a *pure* language
- Haskell is a *lazy* language
- Haskell features an advanced type system (higher-order, polymorphic, ...)

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An example function

Remember the basic structure of a Haskell program; we define sets of functions to create a program:

```
sum         :: Num a => [a] -> a
sum []      = 0
sum (x:xs) = x + sum xs
```

Functions can be defined with patterns or guards to select multiple cases. Types are inferred (and can also be supplied explicitly)

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An example data type

Types can be created using data declarations

```
data Tree a = Empty
            | Leaf a
            | Branch (Tree a) (Tree a)
```

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An example function

We can create functions over those types:

```
tmap f Empty         = Empty
tmap f (Leaf x)      = Leaf (f x)
tmap f (Branch l r) = Branch (tmap f l) (tmap f r)
```

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An example function

Functions are higher-order values and can be partially applied ('curried') to produce new functions:

```
threshold t v | v < t     = v
              | otherwise = t
```

```
boundTr t = tmap (threshold 0.5) t
```

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Thank you

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