

# Finding Cheryl's birthday with DEMO

Malvin Gattinger

April 2015

## 1 Source Code

Download DEMO\_S5.hs and EREL.hs from [http://homepages.cwi.nl/~jve/software/demo\\_s5](http://homepages.cwi.nl/~jve/software/demo_s5) and put them in the same directory. Then you can use `runhaskell cheryl.lhs`.

```
module Main where

import DEMO_S5
import Data.List
import Data.Function

possibilities :: [(Int, String)]
possibilities = [ (15, "May"), (16, "May"), (19, "May"),
  (17, "June"), (18, "June"), (14, "July"), (16, "July"),
  (14, "August"), (15, "August"), (17, "August") ]

init_Cheryl :: EpistM (Int, String)
init_Cheryl = Mo possibilities [a,b] [] rels possibilities where
  rels = [ ( a, groupBy ((==) 'on' snd) possibilities ),
    ( b, groupBy ((==) 'on' fst) (sortBy (compare 'on' fst) possibilities) ) ]

knWhich :: Agent -> Form (Int, [Char])
knWhich i = Disj [ Kn i (Info s) | s <- possibilities ]

listWorlds :: EpistM (Int, String) -> IO ()
listWorlds (Mo _ _ _ _ actuals) = putStrLn (" --> " ++ (show actuals))

main :: IO ()
main = do
  putStrLn "We start with all possibilities."
  listWorlds init_Cheryl
  putStrLn "Albert: I don't know when Cheryl's birthday is and I know that Bernard does not know."
  let model2 = (upd_pa init_Cheryl (Conj [Ng $ knWhich a, Kn a $ Ng (knWhich b)]))
  listWorlds model2
  putStrLn "Bernard: Now I know when Cheryl's birthday is."
  let model3 = (upd_pa model2 (knWhich b))
  listWorlds model3
  putStrLn "Albert: Now I also know when Cheryl's birthday is."
  let model4 = (upd_pa model3 (knWhich a))
  listWorlds model4
  putStrLn "Bye bye."
```

## 2 Output

```
We start with all possibilities.
--> [(15, "May"), (16, "May"), (19, "May"), (17, "June"), (18, "June"), (14, "July"), (16, "July"), (14, "August"), (15, "August"), (17, "August")]
Albert: I don't know when Cheryl's birthday is and I know that Bernard does not know.
--> [(14, "July"), (16, "July"), (14, "August"), (15, "August"), (17, "August")]
Bernard: Now I know when Cheryl's birthday is.
--> [(16, "July"), (15, "August"), (17, "August")]
Albert: Now I also know when Cheryl's birthday is.
--> [(16, "July")]
Bye bye.
```