

Concepts of Programming Languages, Spring term 2019
TestCases

“Recommender System”

Deadline: 17.04.2019

Below you can find the test cases for the recommender system's functions. You can find in the zip file a file named: `DataFile.hs`, which you could import in your project file to load the dataset and the random function provided using: `import DataFile`

```
users = ["user1", "user2", "user3", "user4"]
items = ["item1", "item2", "item3", "item4", "item5", "item6"]
purchasesHistory = [
    ("user1", [ ["item1", "item2", "item3"], ["item1", "item2", "item4"] ]),
    ("user2", [ ["item2", "item5"], ["item4", "item5"] ]),
    ("user3", [ ["item3", "item2"] ]),
    ("user4", [])
]
```

createEmptyFreqList

```
> createEmptyFreqList items
[("item1",[]),("item2",[]),("item3",[]),("item4",[]),("item5",[]),("item6",[])]

> createEmptyFreqList ["dress", "suit", "skirt"]
[("dress",[]),("suit",[]),("skirt",[])]
```

getAllUsersStats

```
> getAllUsersStats purchasesHistory
[
    ("user1", [ ("item1", [ ("item2", 2), ("item3", 1), ("item4", 1) ]), ("item2", [ ("item1", 2), ("item3", 1), ("item4", 1) ]), ("item3", [ ("item1", 1), ("item2", 1) ]), ("item4", [ ("item1", 1), ("item2", 1) ]), ("item5", []), ("item6", []) ]),
    ("user2", [ ("item1", []), ("item2", [ ("item5", 1) ]), ("item3", []), ("item4", [ ("item5", 1) ]), ("item5", [ ("item2", 1), ("item4", 1) ]), ("item6", []) ]),
    ("user3", [ ("item1", []), ("item2", [ ("item3", 1) ]), ("item3", [ ("item2", 1) ]), ("item4", []), ("item5", []), ("item6", []) ]),
    ("user4", [ ("item1", []), ("item2", []), ("item3", []), ("item4", []), ("item5", []), ("item6", []) ])
]
```

freqListItems

```
> freqListItems "user1"
```

```

[("item2",4),("item3",2),("item4",2),("item1",4)]

> freqListItems "user2"
[("item5",2),("item2",1),("item4",1)]

> freqListItems "user3"
[("item3",1),("item2",1)]

> freqListItems "user4"
[]

```

freqListCart

```

> freqListCart "user1" ["item1"]
[("item2",2),("item3",1),("item4",1)]

> freqListCart "user1" ["item2"]
[("item1",2),("item3",1),("item4",1)]

> freqListCart "user1" ["item3"]
[("item1",1),("item2",1)]

> freqListCart "user1" ["item2", "item4", "item6"]
[("item1",3),("item3",1),("item4",1),("item2",1)]

> freqListCart "user1" ["item5"]
[]

```

freqListCartAndItems

```

> freqListCartAndItems "user1" ["item1"]
[("item2",6),("item3",3),("item4",3),("item1",4)]

> freqListCartAndItems "user1" ["item2"]
[("item1",6),("item3",3),("item4",3),("item2",4)]

> freqListCartAndItems "user1" ["item3"]
[("item1",5),("item2",5),("item3",2),("item4",2)]

> freqListCartAndItems "user1" ["item2", "item4", "item6"]
[("item1",7),("item3",3),("item4",3),("item2",5)]

> freqListCartAndItems "user1" ["item5"]
[("item2",4),("item3",2),("item4",2),("item1",4)]

```

purchasesIntersection

```

> purchasesIntersection ([("item1",[("item2",2),("item3",1),("item4",1)])
,("item2",[("item1",2),("item3",1),("item4",1)]),("item3",[("item1",1)
,("item2",1)]),("item4",[("item1",1),("item2",1)]),("item5",[]),("item6
",[])])
([

```

```

("user2 ",[("item1 ",[]),("item2 ",[("item5 ",1)]) ,("item3 ",[]),("item4
",[("item5 ",1)]) ,("item5 ",[("item2 ",1),("item4 ",1)]) ,("item6 ",[])]) ,
("user3 ",[("item1 ",[]),("item2 ",[("item3 ",1)]) ,("item3 ",[("item2 ",1)])
,("item4 ",[]),("item5 ",[]),("item6 ",[])]) ,
("user4 ",[("item1 ",[]),("item2 ",[]),("item3 ",[]),("item4 ",[]),("item5
",[]),("item6 ",[])])
])

[
[
[
("item2 ",[("item5 ",1),("item1 ",2),("item3 ",1),("item4 ",1)]) ,
("item4 ",[("item5 ",1),("item1 ",1),("item2 ",1)])
],
[
("item2 ",[("item3 ",2),("item1 ",2),("item4 ",1)]) ,
("item3 ",[("item2 ",2),("item1 ",1)])
],
[]
]
]

> purchasesIntersection ([("item1 ",[]),("item2 ",[("item5 ",1)]) ,("item3 ",[]),
("item4 ",[("item5 ",1)]) ,("item5 ",[("item2 ",1),("item4 ",1)]) ,("item6
",[])])
([
("user1 ",[("item1 ",[("item2 ",2),("item3 ",1),("item4 ",1)]) ,("item2 ",[("
item1 ",2),("item3 ",1),("item4 ",1)]) ,("item3 ",[("item1 ",1),("item2
",1)]) ,("item4 ",[("item1 ",1),("item2 ",1)]) ,("item5 ",[]),("item6 ",[]
)],
("user3 ",[("item1 ",[]),("item2 ",[("item3 ",1)]) ,("item3 ",[("item2 ",1)])
,("item4 ",[]),("item5 ",[]),("item6 ",[])]),
("user4 ",[("item1 ",[]),("item2 ",[]),("item3 ",[]),("item4 ",[]),("item5
",[]),("item6 ",[])])
])

[
[
[
("item2 ",[("item1 ",2),("item3 ",1),("item4 ",1),("item5 ",1)]) ,
("item4 ",[("item1 ",1),("item2 ",1),("item5 ",1)])
],
[
("item2 ",[("item3 ",1),("item5 ",1)])
],
[]
]
]

> purchasesIntersection ([("item1 ",[]),("item2 ",[("item3 ",1)]) ,("item3 ",[("
item2 ",1)]) ,("item4 ",[]),("item5 ",[]),("item6 ",[])])
([
("user1 ",[("item1 ",[("item2 ",2),("item3 ",1),("item4 ",1)]) ,("item2 ",[("
item1 ",2),("item3 ",1),("item4 ",1)]) ,("item3 ",[("item1 ",1),("item2
",1)]) ,("item4 ",[("item1 ",1),("item2 ",1)]) ,("item5 ",[]),("item6 ",[]
)],
("user2 ",[("item1 ",[]),("item2 ",[("item5 ",1)]) ,("item3 ",[]),("item4
",[("item5 ",1)]) ,("item5 ",[("item2 ",1),("item4 ",1)]) ,("item6 ",[])]),
("user4 ",[("item1 ",[]),("item2 ",[]),("item3 ",[]),("item4 ",[]),("item5
",[]),("item6 ",[])])
])

```

```

[
  [ ("item2", [ ("item1", 2), ("item3", 2), ("item4", 1) ]), ("item3", [ ("item1", 1),
    ("item2", 2) ] ) ],
  [ ("item2", [ ("item5", 1), ("item3", 1) ] ) ],
  []
]

> purchasesIntersection ( [ ("item1", []) , ("item2", []) , ("item3", []) , ("item4",
  " , []) , ("item5", []) , ("item6", []) ] )
([
  ("user1", [ ("item1", [ ("item2", 2), ("item3", 1), ("item4", 1) ]), ("item2", [ ("
    item1", 2), ("item3", 1), ("item4", 1) ]), ("item3", [ ("item1", 1), ("item2",
      " , 1) ]), ("item4", [ ("item1", 1), ("item2", 1) ]), ("item5", []) , ("item6", [])
    ]),
  ("user2", [ ("item1", []) , ("item2", [ ("item5", 1) ]), ("item3", []) , ("item4",
    " , [ ("item5", 1) ]), ("item5", [ ("item2", 1), ("item4", 1) ]), ("item6", []) ] ) ,
  ("user3", [ ("item1", []) , ("item2", [ ("item3", 1) ]), ("item3", [ ("item2", 1) ]),
    ("item4", []) , ("item5", []) , ("item6", []) ] )
])

[
  [] ,
  [] ,
  []
]

```

freqListUsers

```

> freqListUsers "user1"
[ ("item3", 3), ("item1", 6), ("item4", 2), ("item2", 3), ("item5", 2) ]

> freqListUsers "user2"
[ ("item3", 2), ("item5", 3), ("item1", 3), ("item4", 1), ("item2", 1) ]

> freqListUsers "user3"
[ ("item5", 1), ("item3", 3), ("item1", 3), ("item4", 1), ("item2", 2) ]

> freqListUsers "user4"
[]

```

recommendEmptyCart

For user1:

```

> recommendEmptyCart "user1"
"item2"

> recommendEmptyCart "user1"
"item2"

> recommendEmptyCart "user1"
"item2"

> recommendEmptyCart "user1"

```

"item1"

```
> recommendEmptyCart "user1"  
"item2"
```

```
> recommendEmptyCart "user1"  
"item2"
```

```
> recommendEmptyCart "user1"  
"item4"
```

```
> recommendEmptyCart "user1"  
"item1"
```

```
> recommendEmptyCart "user1"  
"item2"
```

```
> recommendEmptyCart "user1"  
"item4"
```

For user2:

```
> recommendEmptyCart "user2"  
"item4"
```

```
> recommendEmptyCart "user2"  
"item4"
```

```
> recommendEmptyCart "user2"  
"item4"
```

```
> recommendEmptyCart "user2"  
"item4"
```

```
> recommendEmptyCart "user2"  
"item5"
```

```
> recommendEmptyCart "user2"  
"item4"
```

```
> recommendEmptyCart "user2"  
"item2"
```

```
> recommendEmptyCart "user2"  
"item2"
```

```
> recommendEmptyCart "user2"  
"item5"
```

```
> recommendEmptyCart "user2"  
"item2"
```

For user3:

```
> recommendEmptyCart "user3"  
"item3"
```

```
> recommendEmptyCart "user3"
"item2"
```

```
> recommendEmptyCart "user3"
"item2"
```

```
> recommendEmptyCart "user3"
"item2"
```

```
> recommendEmptyCart "user3"
"item3"
```

```
> recommendEmptyCart "user3"
"item3"
```

```
> recommendEmptyCart "user3"
"item3"
```

```
> recommendEmptyCart "user3"
"item2"
```

```
> recommendEmptyCart "user3"
"item3"
```

```
> recommendEmptyCart "user3"
"item2"
```

For user4:

```
> recommendEmptyCart "user4"
""
```

recommendBasedOnItemsInCart

For user1 and a cart containing an item he didn't purchase before:

```
> recommendBasedOnItemsInCart "user1" ["item5"]
"item2"
```

```
> recommendBasedOnItemsInCart "user1" ["item5"]
"item3"
```

```
> recommendBasedOnItemsInCart "user1" ["item5"]
"item3"
```

```
> recommendBasedOnItemsInCart "user1" ["item5"]
"item1"
```

```
> recommendBasedOnItemsInCart "user1" ["item5"]
"item2"
```

```
> recommendBasedOnItemsInCart "user1" ["item5"]
"item1"
```

```
> recommendBasedOnItemsInCart "user1" ["item5"]
"item4"
```

```
> recommendBasedOnItemsInCart "user1" ["item5"]  
"item2"
```

```
> recommendBasedOnItemsInCart "user1" ["item5"]  
"item2"
```

```
> recommendBasedOnItemsInCart "user1" ["item5"]  
"item1"
```

For user1 and a cart containing a mix of items he previously purchased and others he didn't purchase before:

```
> recommendBasedOnItemsInCart "user1" ["item2", "item4", "item6"]  
"item3"
```

```
> recommendBasedOnItemsInCart "user1" ["item2", "item4", "item6"]  
"item1"
```

```
> recommendBasedOnItemsInCart "user1" ["item2", "item4", "item6"]  
"item3"
```

```
> recommendBasedOnItemsInCart "user1" ["item2", "item4", "item6"]  
"item3"
```

```
> recommendBasedOnItemsInCart "user1" ["item2", "item4", "item6"]  
"item3"
```

```
> recommendBasedOnItemsInCart "user1" ["item2", "item4", "item6"]  
"item4"
```

```
> recommendBasedOnItemsInCart "user1" ["item2", "item4", "item6"]  
"item2"
```

```
> recommendBasedOnItemsInCart "user1" ["item2", "item4", "item6"]  
"item1"
```

```
> recommendBasedOnItemsInCart "user1" ["item2", "item4", "item6"]  
"item4"
```

```
> recommendBasedOnItemsInCart "user1" ["item2", "item4", "item6"]  
"item3"
```

For user2 and a cart containing an item he didn't purchase before:

```
> recommendBasedOnItemsInCart "user2" ["item1"]  
"item5"
```

```
> recommendBasedOnItemsInCart "user2" ["item1"]  
"item5"
```

```
> recommendBasedOnItemsInCart "user2" ["item1"]  
"item5"
```

```
> recommendBasedOnItemsInCart "user2" ["item1"]  
"item4"
```

```

> recommendBasedOnItemsInCart "user2" ["item1"]
"item4"

> recommendBasedOnItemsInCart "user2" ["item1"]
"item5"

> recommendBasedOnItemsInCart "user2" ["item1"]
"item2"

> recommendBasedOnItemsInCart "user2" ["item1"]
"item5"

> recommendBasedOnItemsInCart "user2" ["item1"]
"item5"

> recommendBasedOnItemsInCart "user2" ["item1"]
"item4"

```

For user2 and a cart containing a mix of items he previously purchased and others he didn't purchase before:

```

> recommendBasedOnItemsInCart "user2" ["item2", "item4", "item6"]
"item5"

> recommendBasedOnItemsInCart "user2" ["item2", "item4", "item6"]
"item5"

> recommendBasedOnItemsInCart "user2" ["item2", "item4", "item6"]
"item5"

> recommendBasedOnItemsInCart "user2" ["item2", "item4", "item6"]
"item5"

> recommendBasedOnItemsInCart "user2" ["item2", "item4", "item6"]
"item4"

> recommendBasedOnItemsInCart "user2" ["item2", "item4", "item6"]
"item5"

> recommendBasedOnItemsInCart "user2" ["item2", "item4", "item6"]
"item4"

> recommendBasedOnItemsInCart "user2" ["item2", "item4", "item6"]
"item4"

> recommendBasedOnItemsInCart "user2" ["item2", "item4", "item6"]
"item4"

> recommendBasedOnItemsInCart "user2" ["item2", "item4", "item6"]
"item2"

```

For user3 and a cart containing an item he didn't purchase before:

```

> recommendBasedOnItemsInCart "user3" ["item1"]
"item3"

> recommendBasedOnItemsInCart "user3" ["item1"]

```



```

"item2"

> recommendBasedOnItemsInCart "user3" ["item5"]
"item2"

> recommendBasedOnItemsInCart "user3" ["item5"]
"item2"

> recommendBasedOnItemsInCart "user3" ["item6"]
"item2"

> recommendBasedOnItemsInCart "user3" ["item6"]
"item2"

> recommendBasedOnItemsInCart "user3" ["item4"]
"item2"

> recommendBasedOnItemsInCart "user3" ["item4"]
"item3"

```

For user3 and a cart containing a mix of items he previously purchased and others he didn't purchased before:

```

> recommendBasedOnItemsInCart "user3" ["item2", "item4"]
"item3"

> recommendBasedOnItemsInCart "user3" ["item2", "item4"]
"item3"

> recommendBasedOnItemsInCart "user3" ["item2", "item4"]
"item3"

> recommendBasedOnItemsInCart "user3" ["item2", "item4"]
"item3"

> recommendBasedOnItemsInCart "user3" ["item2", "item4"]
"item2"

> recommendBasedOnItemsInCart "user3" ["item2", "item4"]
"item3"

> recommendBasedOnItemsInCart "user3" ["item2", "item4"]
"item3"

```

For user4:

```

> recommendBasedOnItemsInCart "user4" ["item2", "item4"]
""
> recommendBasedOnItemsInCart "user4" []
""

```

recommendBasedOnUsers

For user1:

```

> recommendBasedOnUsers "user1"

```

```

"item4"

> recommendBasedOnUsers "user1"
"item3"

> recommendBasedOnUsers "user1"
"item1"

> recommendBasedOnUsers "user1"
"item4"

> recommendBasedOnUsers "user1"
"item1"

> recommendBasedOnUsers "user1"
"item1"

> recommendBasedOnUsers "user1"
"item1"

> recommendBasedOnUsers "user1"
"item1"

> recommendBasedOnUsers "user1"
"item3"

```

For user2:

```

> recommendBasedOnUsers "user2"
"item1"

> recommendBasedOnUsers "user2"
"item5"

> recommendBasedOnUsers "user2"
"item3"

> recommendBasedOnUsers "user2"
"item5"

> recommendBasedOnUsers "user2"
"item5"

> recommendBasedOnUsers "user2"
"item1"

> recommendBasedOnUsers "user2"
"item2"

> recommendBasedOnUsers "user2"
"item4"

> recommendBasedOnUsers "user2"
"item1"

```

```
> recommendBasedOnUsers "user2"  
"item2"
```

For user3:

```
> recommendBasedOnUsers "user3"  
"item5"
```

```
> recommendBasedOnUsers "user3"  
"item3"
```

```
> recommendBasedOnUsers "user3"  
"item4"
```

```
> recommendBasedOnUsers "user3"  
"item3"
```

```
> recommendBasedOnUsers "user3"  
"item5"
```

```
> recommendBasedOnUsers "user3"  
"item1"
```

```
> recommendBasedOnUsers "user3"  
"item1"
```

```
> recommendBasedOnUsers "user3"  
"item2"
```

```
> recommendBasedOnUsers "user3"  
"item3"
```

```
> recommendBasedOnUsers "user3"  
"item4"
```

For user4:

```
> recommendBasedOnUsers "user4"  
""
```

recommend

For Empty carts:

```
> recommend "user1" []  
"item1"
```

```
> recommend "user1" []  
"item4"
```

```
> recommend "user1" []  
"item3"
```

```
> recommend "user1" []  
"item4"
```

```

> recommend "user1" []
"item3"

> recommend "user2" []
"item5"

> recommend "user2" []
"item5"

> recommend "user2" []
"item5"

> recommend "user2" []
"item5"

> recommend "user2" []
"item2"

> recommend "user4" []
"item4"

> recommend "user4" []
"item5"

> recommend "user4" []
"item2"

> recommend "user4" []
"item2"

> recommend "user4" []
"item2"

> recommend "user4" []
"item3"

> recommend "user4" []
"item6"

```

For non-empty carts:

```

> recommend "user1" ["item1", "item2"]
"item4"

> recommend "user1" ["item1", "item2"]
"item2"

> recommend "user1" ["item1", "item2"]
"item3"

> recommend "user1" ["item1", "item2"]
"item1"

> recommend "user2" ["item1", "item2"]
"item4"

```

```
> recommend "user2" ["item1", "item2"]  
"item4"  
  
> recommend "user2" ["item1", "item5"]  
"item2"  
  
> recommend "user2" ["item1", "item5"]  
"item3"
```