Lab Sheet – 5

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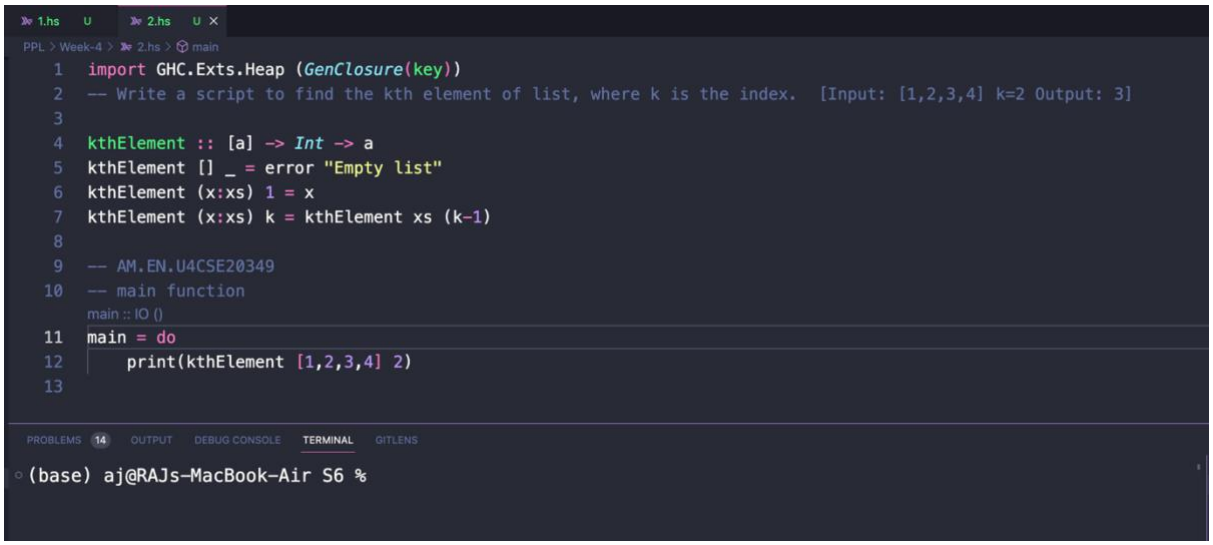
AM.EN.U4CSE20349

1. Write a script to **find the last but one element** of a list. [Input: [1,2,3,4] Output: 3]

2. Write a script to **find the kth element of list**, where k is the index. [Input: [1,2,3,4] k=2 Output: 3]



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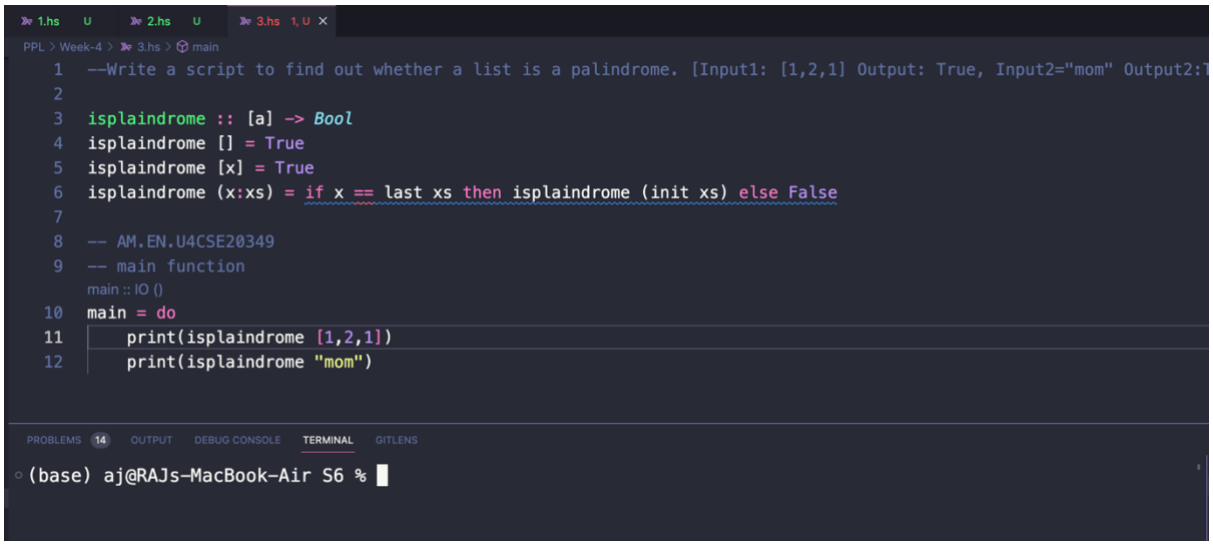
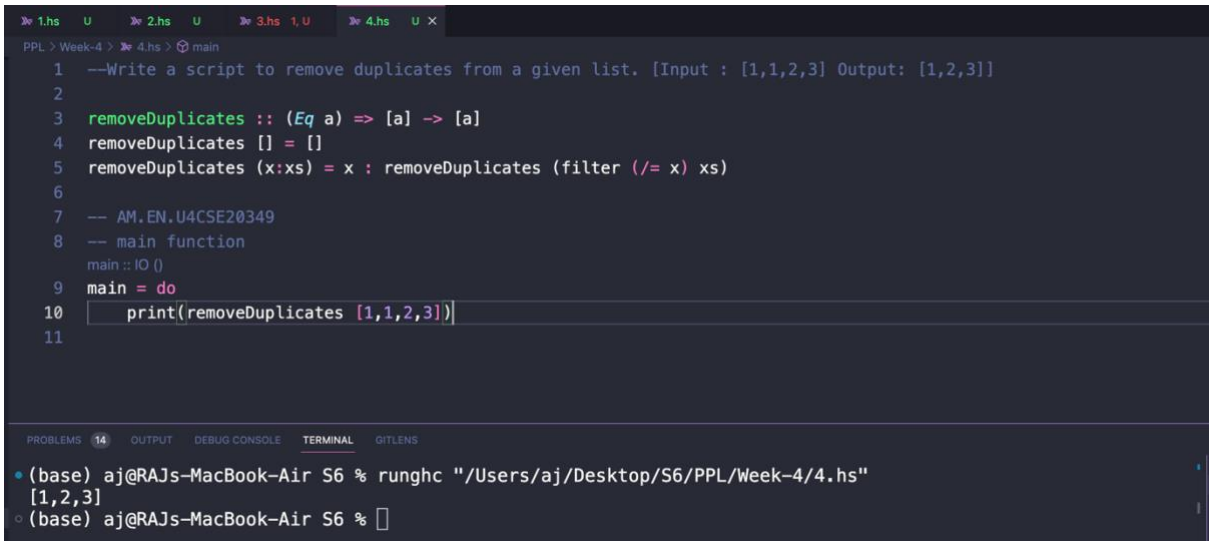
3. Write a script to find out whether a list is a **palindrome**. [Input1: [1,2,1] Output: True, Input2="mom" Output2:True]



4. Write a script to **remove duplicates** from a given list. [Input : [1,1,2,3] Output: [1,2,3]]



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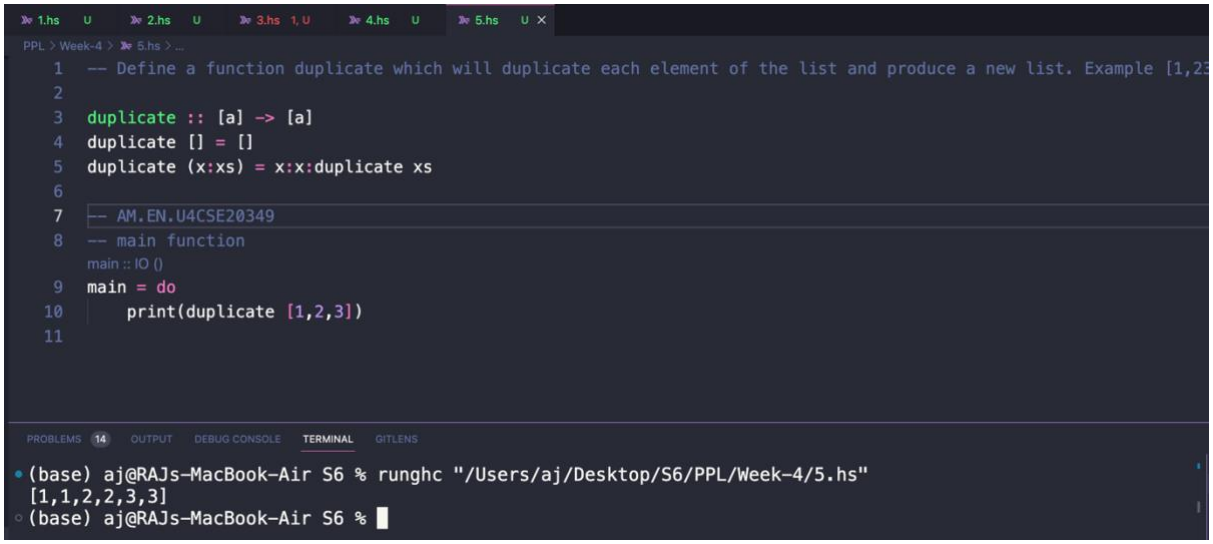
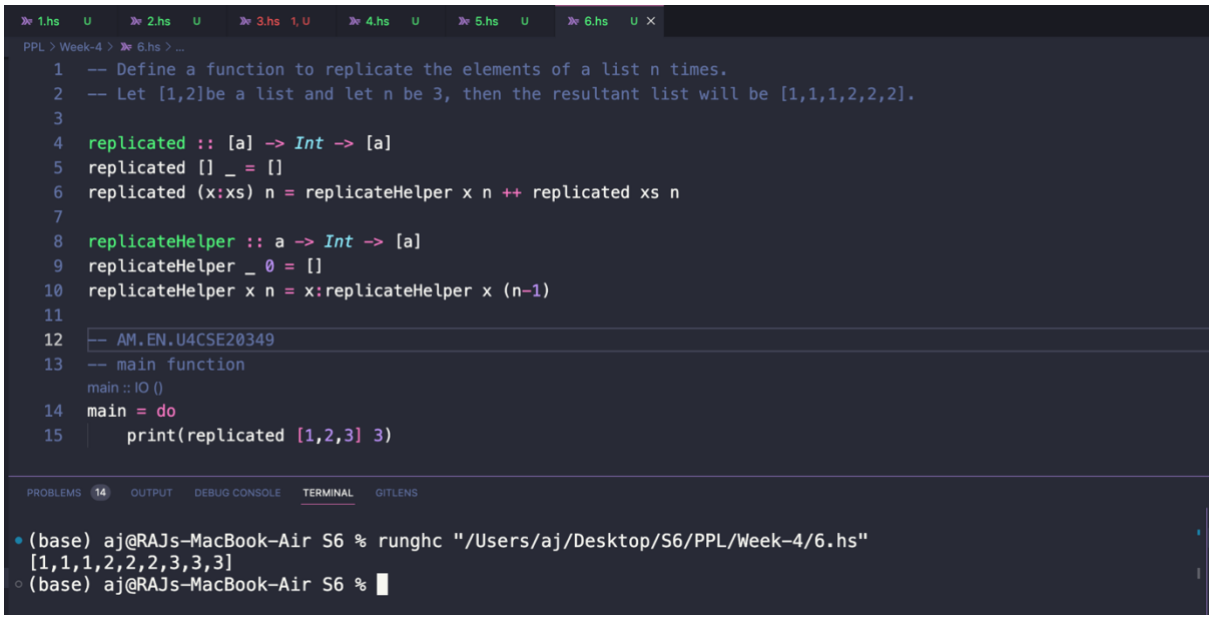
5. Define a function duplicate which will **duplicate each element of the list** and produce a new list. Example [1,23] - will give output [1,1,2,2,3,3].



6. Define a function to **replicate the elements of a list n times**. Let [1,2]be a list and let n be 3, then the resultant list will be [1,1,1,2,2,2].



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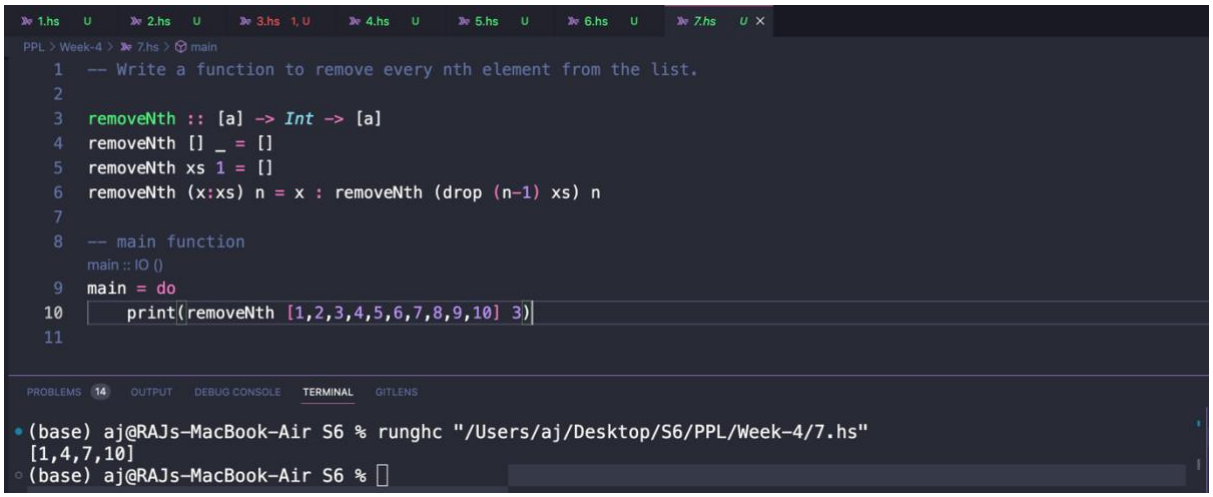
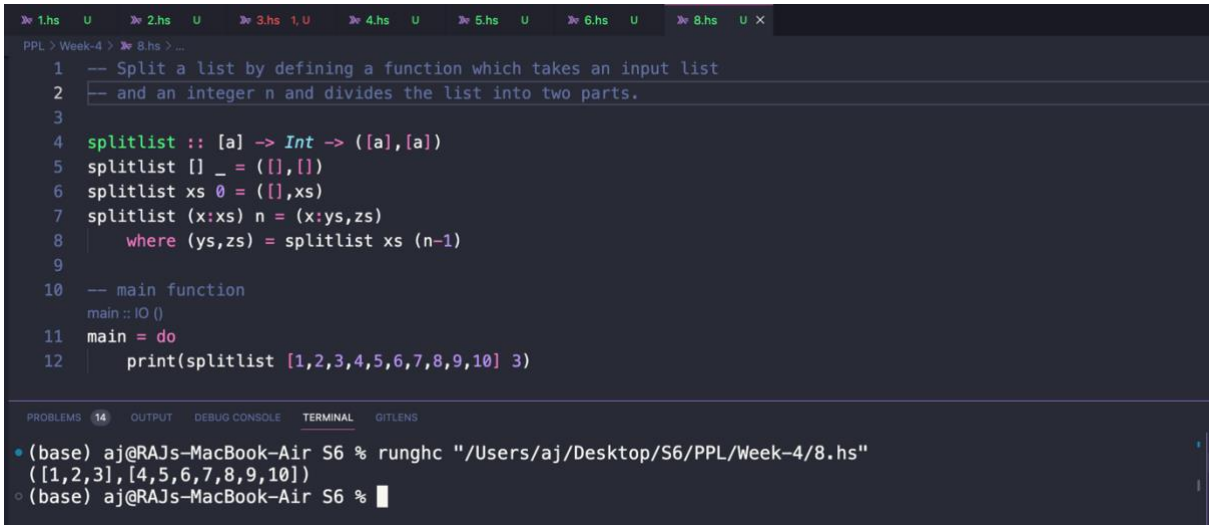
7. Write a function to **remove every nth element** from the list. Let **[1,2,3,4,5,6,7,8,9,10]** be the list and value of **n be 3**, then the resultant list will be [1,2,4,5,7,8,10](after every nth element of the input list is [1,2,3,4,5,6,7,8,9,10] removed).



8. **Split a list** by defining a function which takes an input **list** and an **integer n** and divides the list into two the **first n elements as the first list**and **the rest as the second list** and form a list of lists. Let [1..10] be a list and value of n be 4 then the new list formed is 1,2,3,4],[5,6,7,8,9,10. Another example I/P splits "amr" 4 & O/P- ["amr",""]



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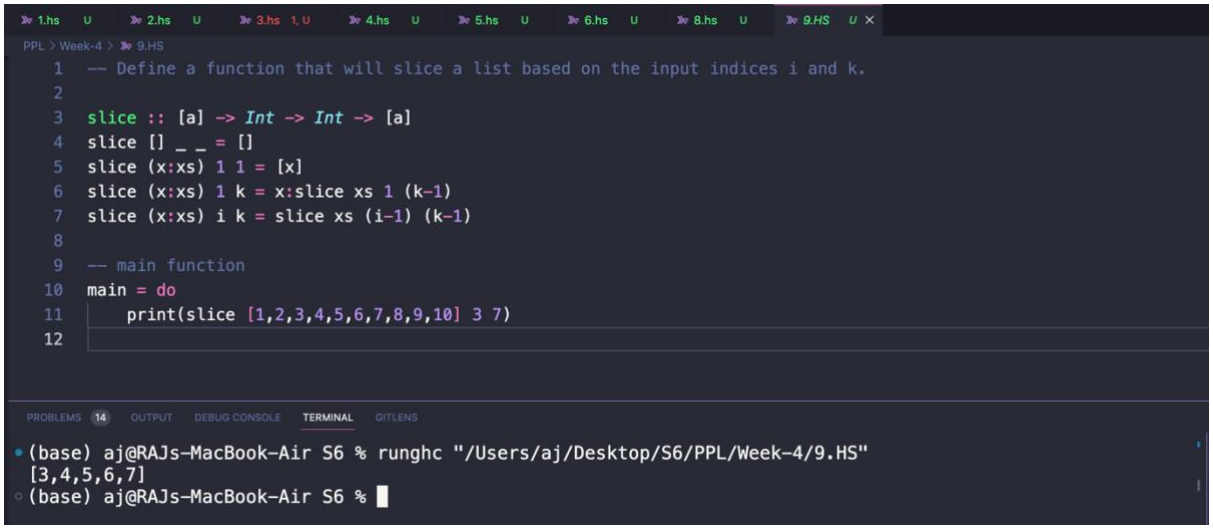
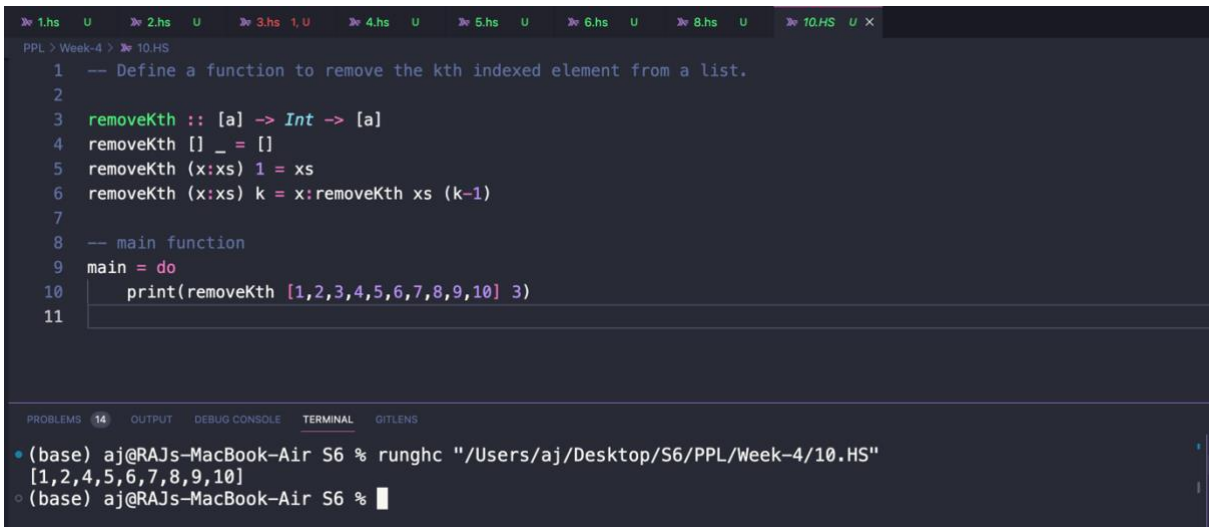
9. Define a function that will **slice a list** based on the input indices i and k. Consider a list **[1..10]** and let **i = 2** and **k = 4** respectively then the resultant list will be **[3,4,5].**



10. Define a function to **remove the kth indexed element** from a list. Consider a list [1..10], and value of **n** be **2**, then resultant list will be [1,2,4,5,6,7,8,9,10].



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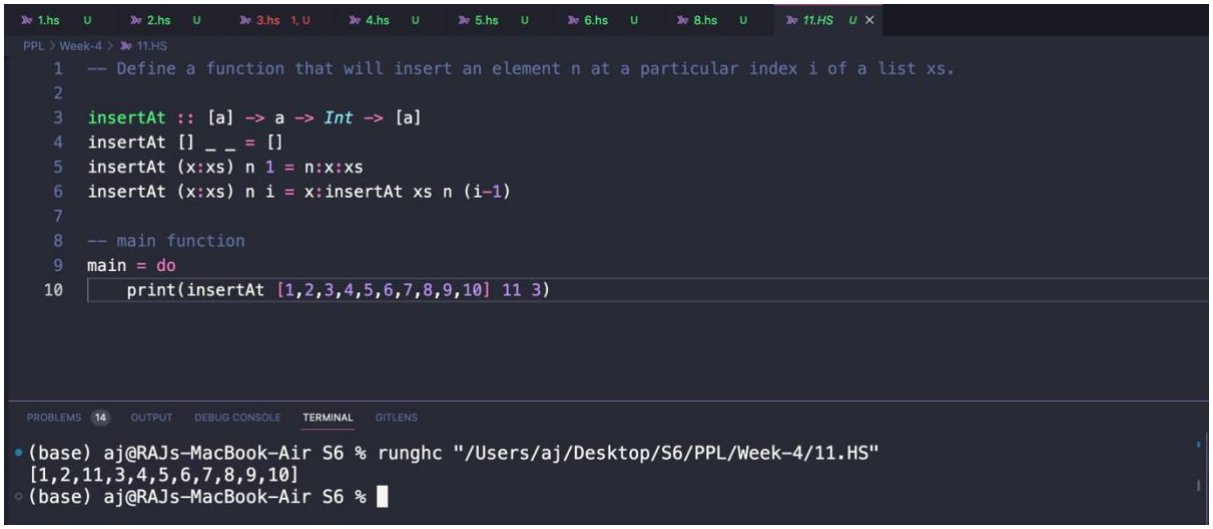
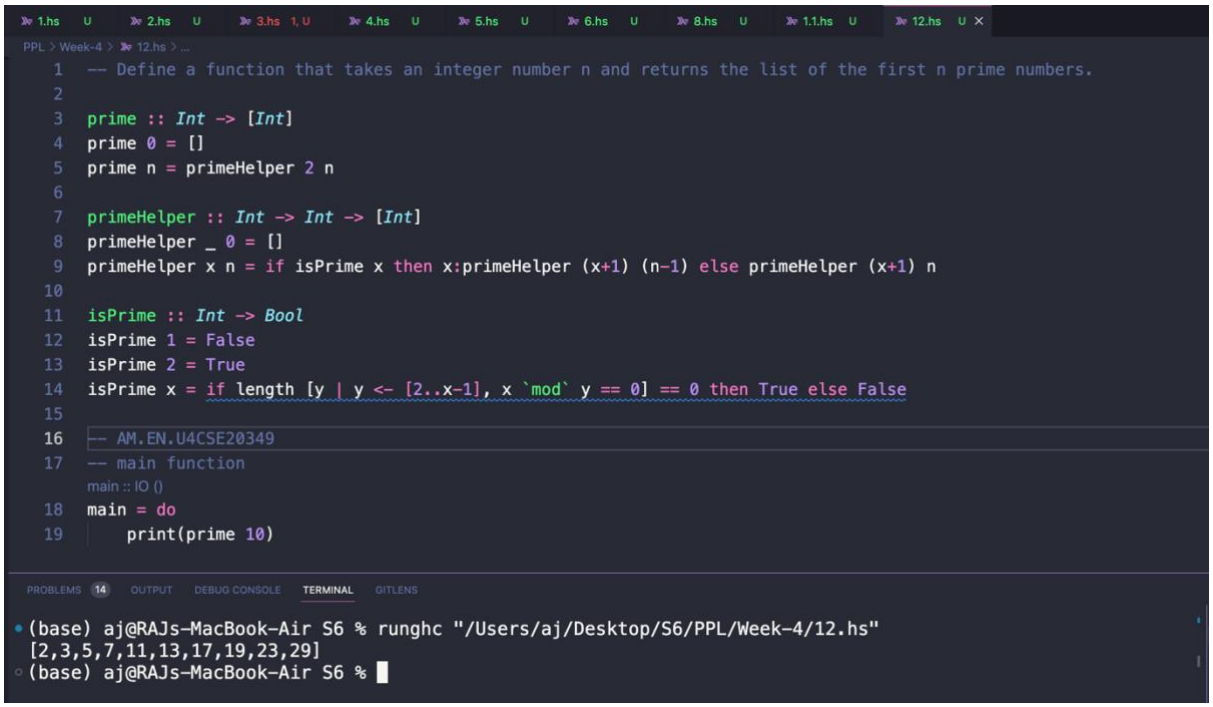
11. Define a function that will **insert an element** n **at a particular index** i of a list xs. Let xs=[1..10], i=2, n=11, then the output will be [1,2,11,3,4,5,6,7,8,9,10].



1. Define a function that takes an integer number **n** and returns the list of the **first n prime numbers**.



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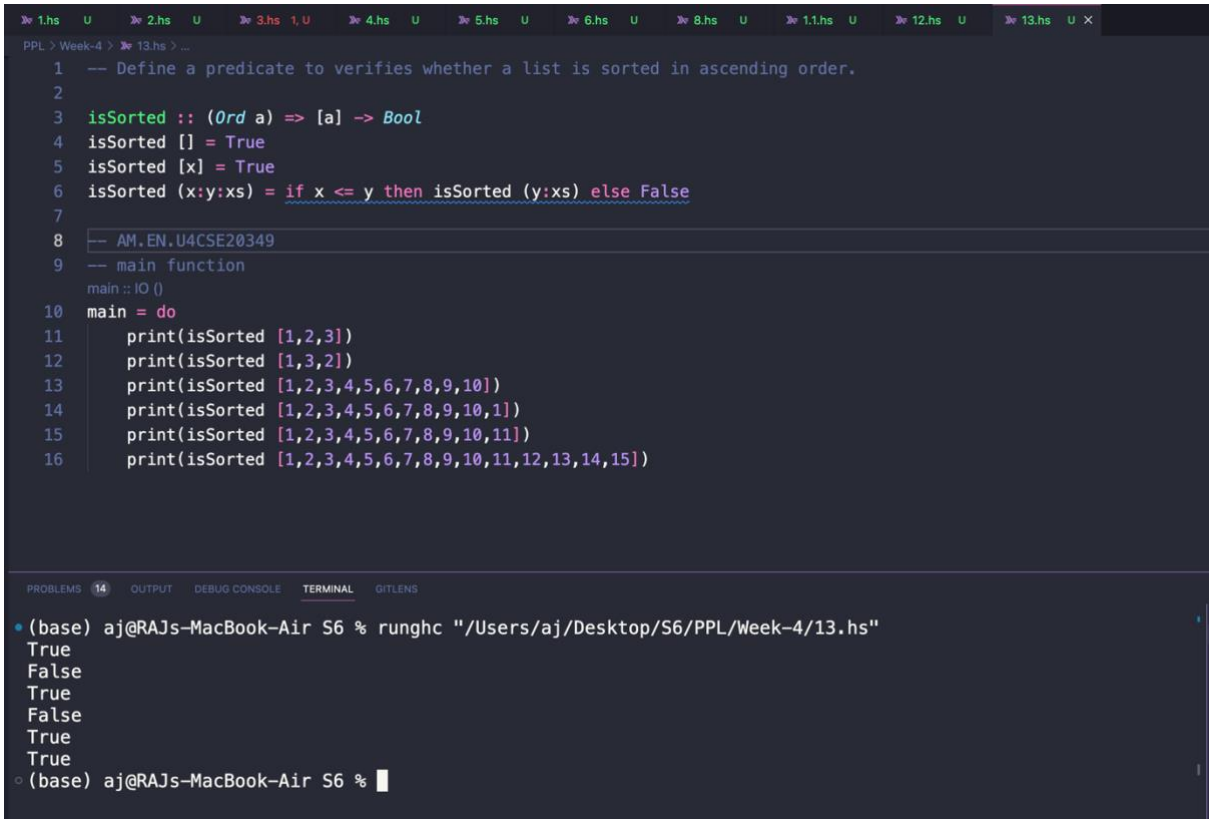
2. Define a predicate to verifies whether a list is sorted in **ascending order**.



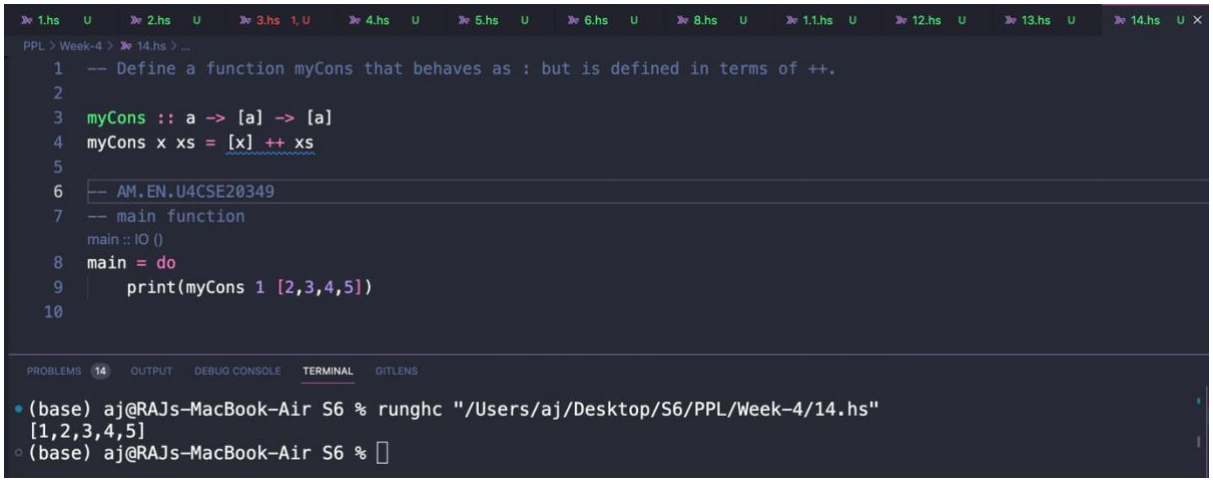
```haskell
-- Define a predicate to verifies whether a list is sorted in ascending order.

isSorted :: (Ord a) => [a] -> Bool
isSorted [] = True
isSorted [x] = True
isSorted (x:y:xs) = if x <= y then isSorted (y:xs) else False

-- AM.EN.U4CSE20349
-- main function
main :: IO ()
main = do
    print(isSorted [1,2,3])
    print(isSorted [1,3,2])
    print(isSorted [1,2,3,4,5,6,7,8,9,10])
    print(isSorted [1,2,3,4,5,6,7,8,9,10,1])
    print(isSorted [1,2,3,4,5,6,7,8,9,10,11])
    print(isSorted [1,2,3,4,5,6,7,8,9,10,11,12,13,14,15])
```

```
(base) aj@RAJs-MacBook-Air S6 % runghc "/Users/aj/Desktop/S6/PPL/Week-4/13.hs"
True
False
True
False
True
True
(base) aj@RAJs-MacBook-Air S6 %
```

3. Define a function **myCons** that behaves as **:** but is defined in terms of **++.**



```haskell
-- Define a function myCons that behaves as : but is defined in terms of ++.

myCons :: a -> [a] -> [a]
myCons x xs = [x] ++ xs

-- AM.EN.U4CSE20349
-- main function
main :: IO ()
main = do
    print(myCons 1 [2,3,4,5])
```

```
(base) aj@RAJs-MacBook-Air S6 % runghc "/Users/aj/Desktop/S6/PPL/Week-4/14.hs"
[1,2,3,4,5]
(base) aj@RAJs-MacBook-Air S6 %
```

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4. Define a function that takes an integer **number n** and a **value v** and creates a list containing **n occurrences of v.**

5. To find all the digits in a string where the prelude function

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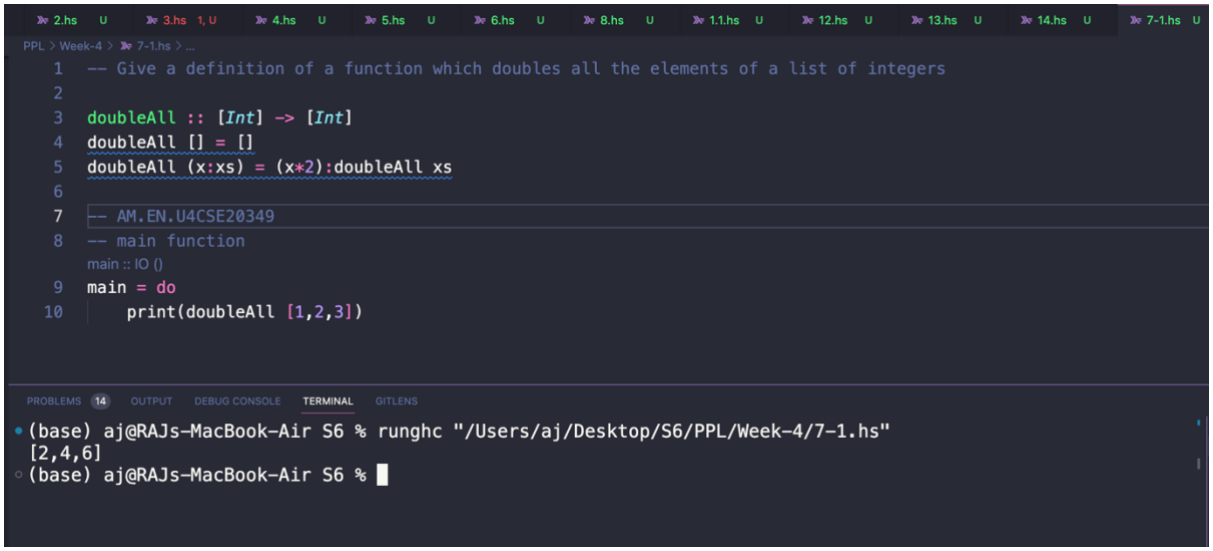
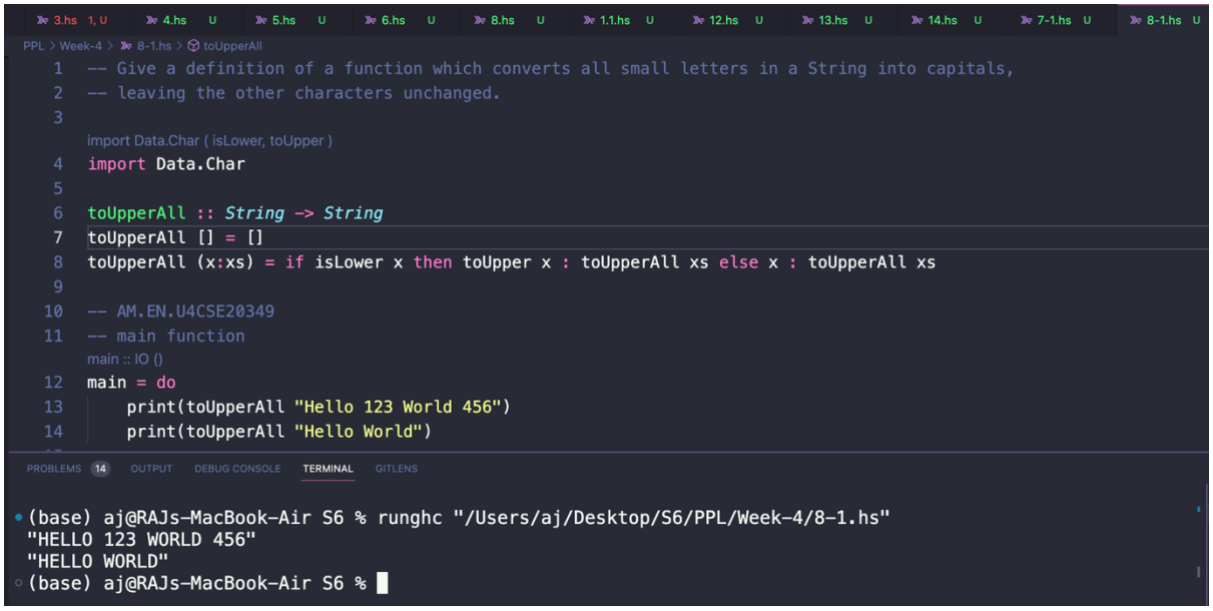
6. Give a definition of a function which **doubles all** the elements of a list of integers



7. Give a definition of a function which **converts** all **small letters** in a String **into capitals**, leaving the other characters unchanged.



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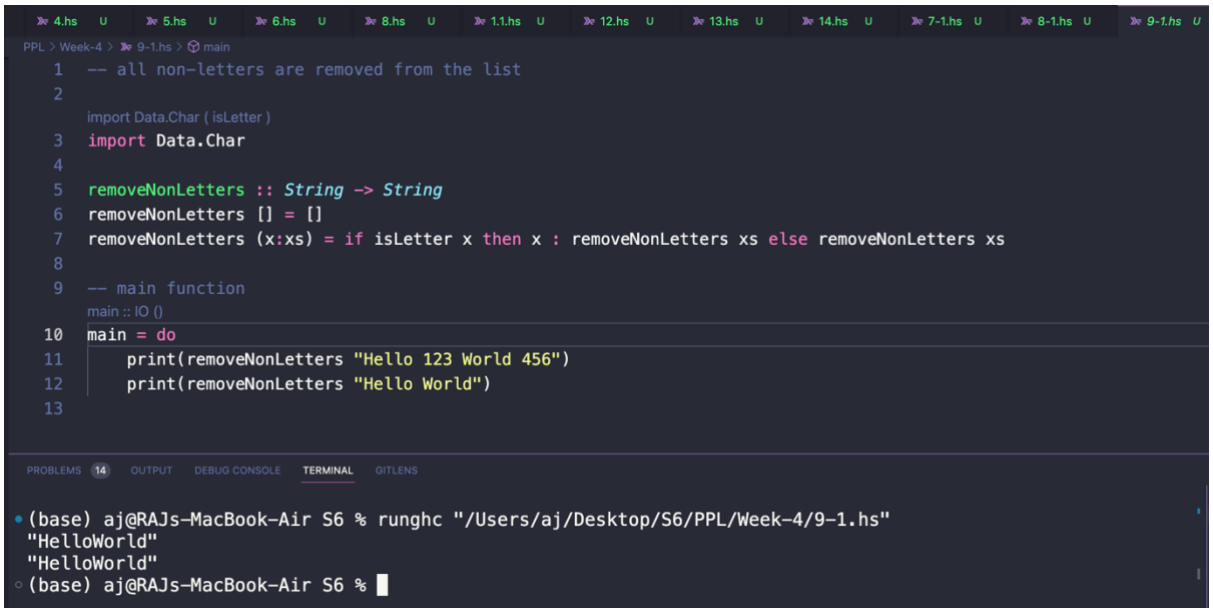
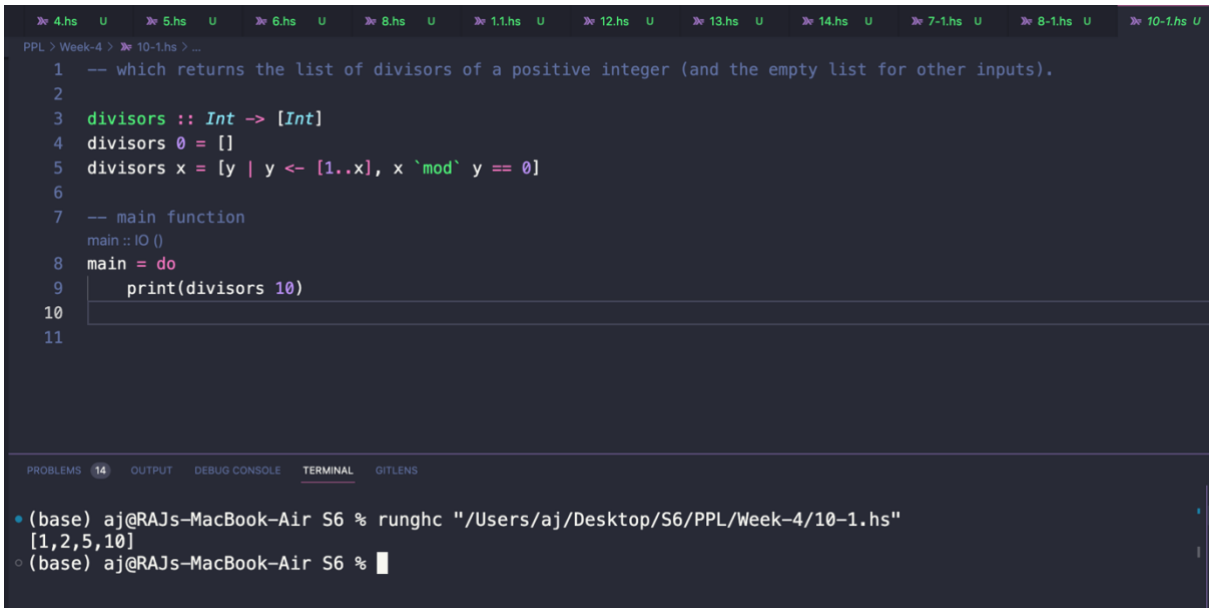
8. How would you modify above function to give which behaves in the same way except that all non-letters are removed from the list? You should check the Char .hs library to see whether it contains any functions useful in solving this problem.



9. Define the function which **returns** the **list of divisors** of a **positive integer** (and the empty list for other inputs).



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10. Define the function which picks out all occurrences of an integer n in a list. For instance,

```haskell
-- which picks out all occurrences of an integer n in a list of integers

occurances :: Int -> [Int] -> [Int]
occurances _ [] = []
occurances n (x:xs) = if n == x then x:occurances n xs else occurances n xs

-- AM.EN.U4CSE20349
-- main function
main :: IO ()
main = do
    print(occurances 2 [1,2,3,2,2,2,3,4,5] )
```

```
(base) aj@RAJs-MacBook-Air S6 % runghc "/Users/aj/Desktop/S6/PPL/Week-4/11-1.hs"
[2,2,2,2]
(base) aj@RAJs-MacBook-Air S6 %
```

11. Using matches or otherwise, define a function which is **True** if the **Int** is **an element** of the list, and **False otherwise**.

```haskell
-- which is True if the Int is an element of the list, and False otherwise.

isElem :: Int -> [Int] -> Bool
isElem _ [] = False
isElem x (y:ys) = if x == y then True else isElem x ys

-- AM.EN.U4CSE20349
-- main function
main :: IO ()
main = do
    print(isElem 1 [1,2,3])
    print(isElem 4 [1,2,3])
    print(isElem 1 [1,2,3,4,5,6,7,8,9,10])
    print(isElem 4 [1,2,3,5,6,7,8,9,10,1])
    print(isElem 1 [1,2,3,4,5,6,7,8,9,10,11])
    print(isElem 1 [1,2,3,4,5,6,7,8,9,10,11,12,13,14,15])
```

```
(base) aj@RAJs-MacBook-Air S6 % runghc "/Users/aj/Desktop/S6/PPL/Week-4/12-1.hs"
True
False
True
False
True
True
(base) aj@RAJs-MacBook-Air S6 %
```

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12. Given a list of lists, sum the lengths of inner lists - sumLength [[1,2][2,3][5,7,8,9]] must return 8