Department of Cyber Security

Amrita School of Computing

Amrita Vishwa Vidyapeetham, Chennai Campus

Principals of Programming Languages

Subject Code: 20CYS312 Date:2024/11/29

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Lab 1: Introduction to Programming Paradigms (Simple Programs in Haskell)

Part 1: Haskell Exercises (45 minutes)

1. Basic Arithmetic:

Objective: Get familiar with GHCi and basic arithmetic operations.

Exercise 1: Open GHCi and perform basic arithmetic operations:

Haskell Code

```
3 + 5

10 * 4

 6 / 2
```

Output:

Exercise 2: Define a function to calculate the square of a number:

Open Terminal.

Create a file with the .hs extension using nano (or your preferred text editor). Or(nano.file name .hs).

Write the following code inside the square.hs file § Press Ctrl + X to exit nano.

Press Y to confirm saving the file, then press Enter to confirm the filename (square.hs).

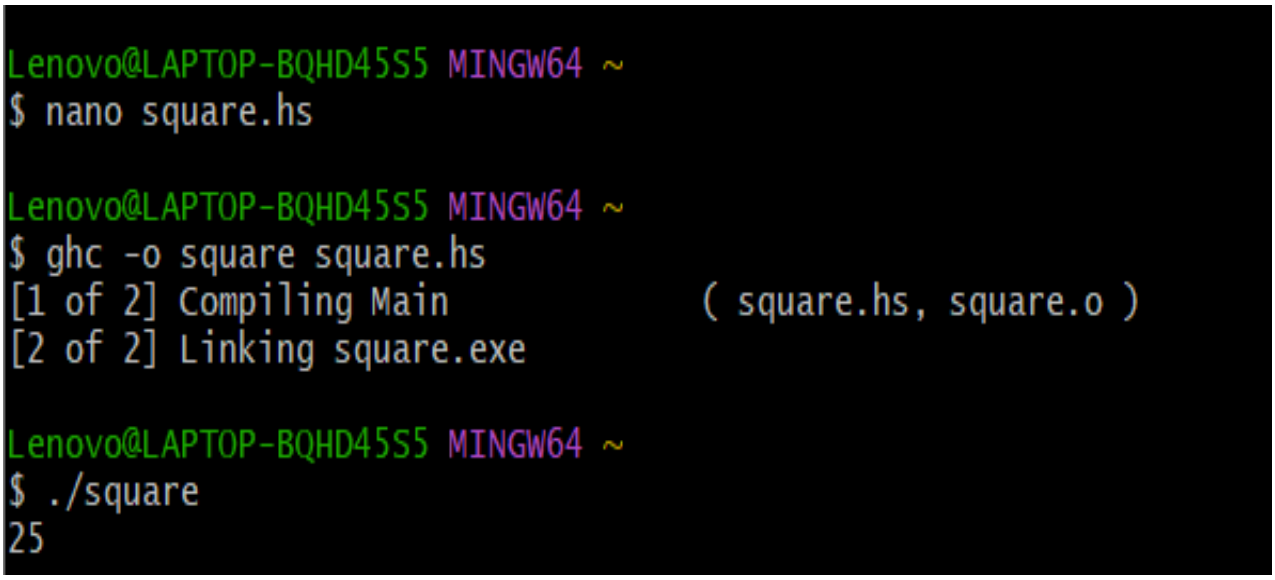
Compile the program by running the following command:

```
ghc -o square square.hs
./square
```

Haskell Code

```
square :: Int -> Int
square x = x * x
main :: IO ()
main = print (square 5)
```

Output:



2. Defining and Using Lists:

Objective: Understand basic data structures like lists in Haskell.

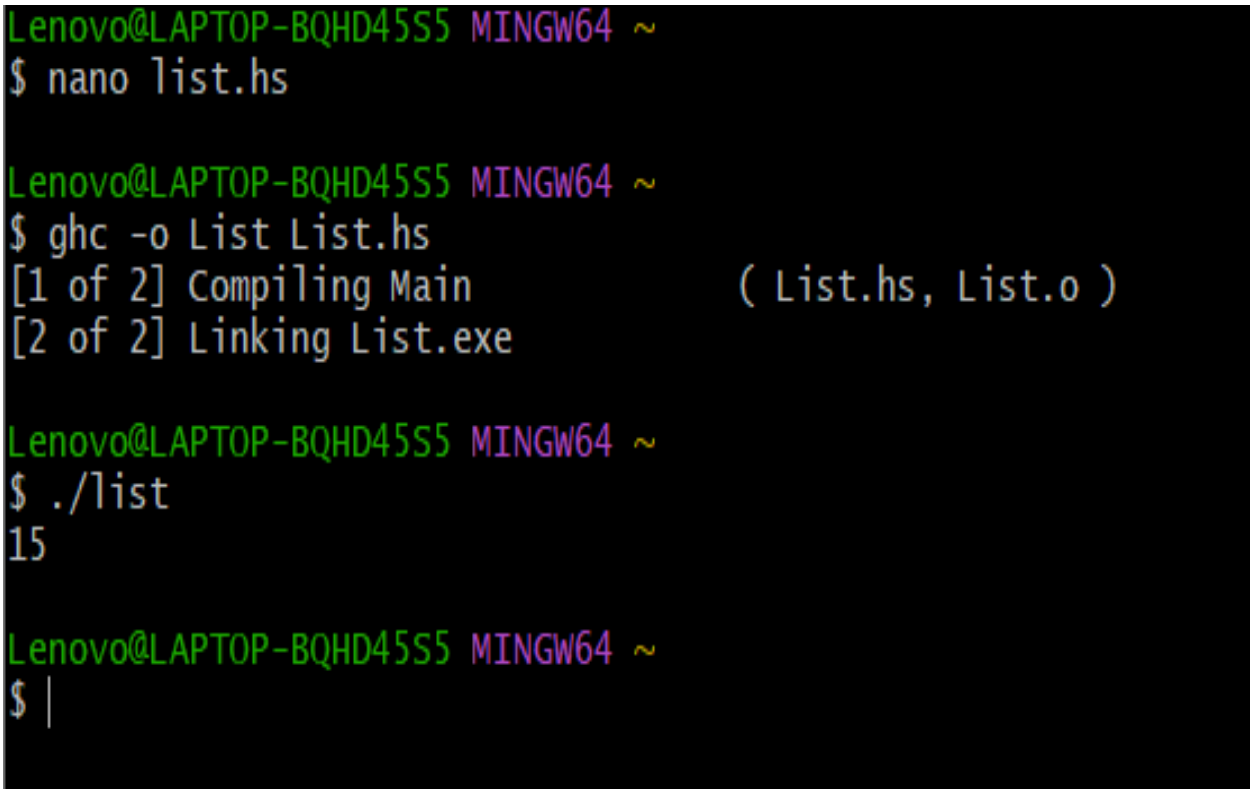
Exercise 3: Create a list of numbers and compute the sum of the list:

Haskell Code

```
sumList :: [Int] -> Int
sumList [] = 0 sumList (x:xs) = x + sumList xs
```

Test with: sumList [1, 2, 3, 4, 5]

Output:



3. Pattern Matching with Lists:

Objective: Learn how pattern matching works in Haskell.

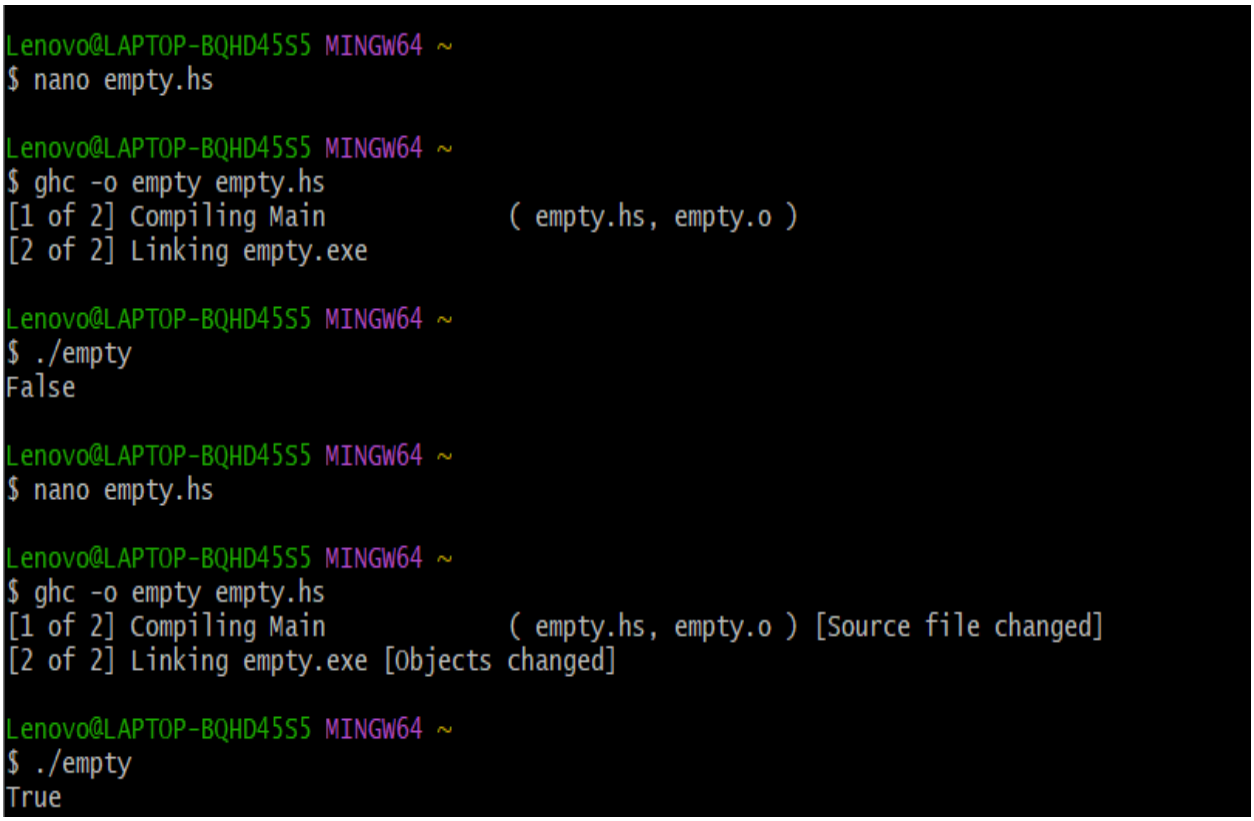
Exercise 4: Write a function to check if a list is empty:

Haskell Code

```
isEmpty :: [a] -> Bool
isEmpty [] = True
 isEmpty _ = False
```

Test with: isEmpty [1, 2, 3] and isEmpty [].

Output:



4. Simple IO Operations:

Objective: Understand basic input and output in Haskell.

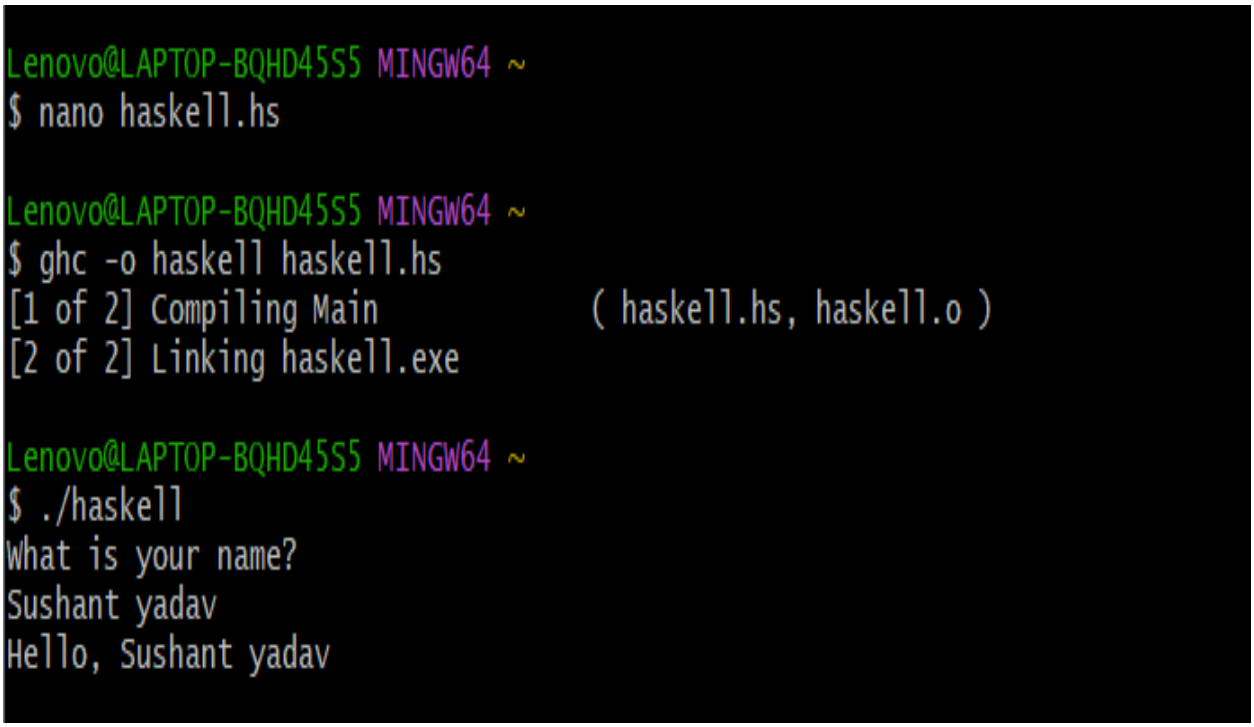
Exercise 5: Write a program that asks the user for their name and prints a greeting:

haskell

Copy code

```
main :: IO ()
main = do putStrLn "What is your name?"
name <- getLine
putStrLn ("Hello, " ++ name)
```

Output:


Lenovo@LAPTOP-BQHD45S5 MINGW64 ~
$ nano haskell.hs
Lenovo@LAPTOP-BQHD45S5 MINGW64 ~
$ ghc -o haskell haskell.hs
[1 of 2] Compiling Main (haskell.hs, haskell.o)
[2 of 2] Linking haskell.exe
Lenovo@LAPTOP-BQHD45S5 MINGW64 ~
$ ./haskell
What is your name?
Sushant yadav
Hello, Sushant yadav