Google Go Programming Language

REPORT submitted in partial fulfillment of the requirements

Submitted By

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V R SIDDHARTHA ENGINEERING COLLEGE

(AUTONOMOUS - AFFILIATED TO JNTU-K, KAKINADA)

Approved by AICTE & Accredited by NBA

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V.R.SIDDHARTHA ENGINEERING COLLEGE

(Affiliated to JNTUK: Kakinada, Approved by AICTE, Autonomous)

(An ISO certified and NBA accredited institution)

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CERTIFICATE

This is to certify that this project report titled **"Go language"** is a bonafide record of work done by **M . J . N. V. Sai (208W1A12A0)** under my guidance and supervision is submitted in partial fulfillment of the requirements for the award of the degree of Bachelor of Technology in Information Technology, **V.R. Siddhartha Engineering College** (Autonomous under JNTUK) during the year 2022-23.

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CHAPTER – 1

1.1 Installation And Introduction to variables in the Google Go Programming Language

Procedure :

1. First, Visit the Website of google called " http://go.dev/dl/ ".
2. From there download the Microsoft windows . msi and then run it.
3. After giving the all access permissions for the software create a folder With a name called " go " in the system default drive called C Drive And then navigate to the Users Directory and then create a folder A name called " go ".
4. Now, copy the created folder path and then click the ⊞ + R at the same time and then type " sysdm.cpl ,3 " and then click on the environmental variables.
5. Then navigate to the bottom down variables block and click on New button and set the variable name to " GOPATH " and paste the copied one in the variable path. Then click on OK or SAVE.
6. Final step is go to the Coomand Prompt and type " %GOPATH % " and the created folder will open this results the the path setting in google go environment is success.

Program :

```
package main

import "fmt" // importing the inbuilt functions


func main( ){

    fmt.Println("Different types of variable declarations.")

    var k int

    k = 10

    // m = 10 is a wrong format
```

```
    m := 10
    fmt.Println("k and m values are : ", k, " ", m)
    var b, c int = 1, 3
    var k1 = 34
    var K1 = 32
    fmt.Println("values of b, c, k1, K1 are : ", b, " ", c, " ", k1, " ", K1)
}
```

Output :

```
Command Prompt
Microsoft Windows [Version 10.0.19042.867]
(c) 2020 Microsoft Corporation. All rights reserved.

C:\Users\SHREEE>cd go

C:\Users\SHREEE\go>go run variable.go
Different types of variable declarations.
k and m values are :  10   10
values of b, c, k1, K1 are :  1   3   34   32

C:\Users\SHREEE\go>
```

Result : Successfully Executed the Program.

CHAPTER – 2

2.1 Understanding the Different Types of DataTypes in the Google Go Programming language.

Description :

1. Datatypes plays an important and major role in any programming language and they play as base to all programming stratiges.
2. They store only a single type of data at only in a life time and allocated the memory id and type of the data stored in that memory part.
3. There are different types of datatypes in google go programming language and some the basic data types are below one's :
    - Boolean Data Type
    - Integer Data Type
    - String Data Type
    - Float Data Type

Program :

```
package main

import "fmt"


func main(){

        // Integer DataTypes

        var x int = 500

        var x1 = 200

        x2 := 4500

        fmt.Printf("Type: %T, value: %v\n",x,x) // %T and %v works on only Printf

                        Function..

        fmt.Printf("Type: %T, value: %v\n",x1,x1)
```

```
fmt.Printf("Type: %T, value: %v\n",x2,x2)

// Float Datatypes
fmt.Println()
var y float32 = 12.56 // or you can use float64 type also
var y1 = 19.999
y2 := 10.15
fmt.Printf("Type: %T, value: %v\n",y,y)
fmt.Printf("Type: %T, value: %v\n",y1,y1)
fmt.Printf("Type: %T, value: %v\n",y2,y2)

// String Datatypes
fmt.Println()
var z string = "Hello World!"
var z1 = "Welcome To The Go lang World"
z3 := 'A'
z2 := "I am Faster than Python and Efficient Than Java"
fmt.Printf("Type: %T, value: %v\n",z,z)
fmt.Printf("Type: %T, value: %v\n",z1,z1)
fmt.Printf("Type: %T, value: %v\n",z2,z2)
fmt.Printf("Type: %T, value: %v\n",z3,z3)

// Boolean DataTypes
fmt.Println()
var a bool = true
```

```
    var a1 = false
    a2 := true
    fmt.Printf("Type: %T, value: %v\n",a,a)
    fmt.Printf("Type: %T, value: %v\n",a1,a1)
    fmt.Printf("Type: %T, value: %v\n",a2,a2)
}
```

Output :

Command Prompt

```
C:\Users\SHREEE\go>go run Datatypes.go
Type: int, value: 500
Type: int, value: 200
Type: int, value: 4500

Type: float32, value: 12.56
Type: float64, value: 19.999
Type: float64, value: 10.15

Type: string, value: Hello World!
Type: string, value: Welcome To The Go lang World
Type: string, value: I am Faster than Python and Efficient Than Java
Type: int32, value: 65

Type: bool, value: true
Type: bool, value: false
Type: bool, value: true

C:\Users\SHREEE\go>
```

Result : Sucessfully Executed the Program.

CHAPTER – 3

3.1 Apply the Logical, Arithimatic, Control Structures in Google Go Programming Language.

Description :

1. Arithimatic operations are common in all operations they are addition, subtraction, multiplication, Division just we have to apply them on a variable in which they are holding a integer or float data.
2. Logical operators are AND(&&), OR(||), NOT(!) these operator will help us in finding the Boolean values as their result and they also help in building the logic in problem.
3. Control structures are very famous in any programming languages and some of the control structures are :
    - If else Condition
    - While condition
    - For condition

Program :

```
//go build hello-world.go ==> it converts .go code to an encrypted binary code language

//dir

//./hello-world ==> this command used for running the file.go


package main


// By using paranthesis () after import we can import multiple inbuilt functions and packages

import (
```

```
    "fmt"
    "math"
)

const s string = "constant"

func main() {

    // Concatination Of Strings
    str1 := "go"
    str2 := " language"
    fmt.Println("String 1 : ", str1)
    fmt.Println("String 2 : ", str2)
    fmt.Println("Concatination of 2 Strings : ", str1 + str2)

    fmt.Println()

    // Performing Arthimatic Operations
    num1 := 5
    num2 := 10
    num3 := 5.65
    num4 := 8.9
    fmt.Println("Number 1 : ", num1)
    fmt.Println("Number 2 : ", num2)
    fmt.Println("Addition of 2 Numbers are : ", num1 + num2)
```

```
fmt.Println("Subraction of 2 Numbers are : ", num1 - num2)
fmt.Println("Multiplication of 2 Numbers are : ", num1 * num2)
fmt.Println("Division of 2 Float Numbers : ", num3 / num4)

fmt.Println()

// Performing Logical Operations
var b1 bool = true
var b2 bool = false
fmt.Println("Data Stored in Variable b1 is : ", b1)
fmt.Println("Data Stored in Variable b2 is : ", b2)
fmt.Println("Applying AND Opearation with different values : ", b1 && b2)
fmt.Println("Applying AND Opearation with Same Values : ", b1 && b1)
fmt.Println("Applying OR Opearation with different values: ", b1 || b2)
fmt.Println("Applying OR Opearation with Same values: ", b2 || b2)
fmt.Println("Applying NOT(!) Opearation : ", !b1)

fmt.Println()

// Performing Constatant Data Type
fmt.Println("Value Stored in S variable which is a Constatnt DataType : ", s)
//const n = 50000000 // explicit conversion.
const n = 50

const d = 3e20 / n
```

```
fmt.Println("the value of 3e20 is : ", 3e20)

fmt.Println("Converting the Biggest number : ", int64(d))

fmt.Println(" value of sin 50 is : ", math.Sin(n))

fmt.Println()

//Performing the Conditional and Control Structures
i := 1
fmt.Println("for loop with Single Condition printing 1 to 3 Numbers :")
for i <= 3 {
   fmt.Println(i)
   i = i + 1
}

fmt.Println("for loop with 3 conditions printing 7 to 9 Numbers : ")
for j := 7; j <= 9; j++ {
   fmt.Println(j)
}

fmt.Println("for loop with no conditions : ")
for {
   fmt.Println("loop")
   break
```

```
}

fmt.Println("Printing the Odd numbers using For loop : ")
for n := 0; n <= 5; n++ {
   if n%2 == 0 {
      continue
   }
   fmt.Println(n)
}

// Checking the even odd Conditions
if 7%2 == 0 {
   fmt.Println("7 is even")
} else {
   fmt.Println("7 is odd")
}

// Checking the divisibility Conditions
if 8%4 == 0 {
   fmt.Println("8 is divisible by 4")
}

// checking the Positive, Negative, Single digits
if num := 9; num < 0 {
   fmt.Println(num, "is negative")
```

```
    } else if num < 10 {
        fmt.Println(num, "has 1 digit")
    } else {
        fmt.Println(num, "has multiple digits")
    }
}
```

Output :

```
Command Prompt
Microsoft Windows [Version 10.0.19042.867]
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C:\Users\SHREEE>cd go

C:\Users\SHREEE\go>go build control_structures.go

C:\Users\SHREEE\go>dir
 Volume in drive C has no label.
 Volume Serial Number is 8EEA-E27C

 Directory of C:\Users\SHREEE\go

22-09-2022  08:37 PM    <DIR>          .
22-09-2022  08:37 PM    <DIR>          ..
22-09-2022  08:37 PM         1,963,520 control_structures.exe
22-09-2022  08:35 PM             3,267 control_structures.go
18-09-2022  03:15 PM             1,131 Datatypes.go
17-08-2022  08:07 PM                88 test.go
17-08-2022  08:18 PM               347 variable.go
               5 File(s)      1,968,353 bytes
               2 Dir(s)  143,071,137,792 bytes free

C:\Users\SHREEE\go>./control_structures
'.' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\SHREEE\go>go run control_structures.go
String 1 :  go
String 2 :   language
Concatination of 2 Strings :  go language

Number 1 :  5
Number 2 :  10
Addition of 2 Numbers are :  15
Subraction of 2 Numbers are :  -5
Multiplication of 2 Numbers are :  50
Division of 2 Float Numbers :  0.6348314606741573

Data Stored in Variable b1 is :  true
Data Stored in Variable b2 is :  false
Applying AND Opearation with different values :  false
Applying AND Opearation with Same Values :  true
Applying OR Opearation with different values:  true
Applying OR Opearation with Same values:  false
Applying NOT(!) Opearation :  false
```

```
Value Stored in S variable which is a Constatnt DataType :  constant
the value of 3e20 is :  3e+20
Converting the Biggest number :  6000000000000000000
 value of sin 50 is :  -0.26237485370392877

for loop with Single Condition printing 1 to 3 Numbers :
1
2
3
for loop with 3 conditions printing 7 to 9 Numbers :
7
8
9
for loop with no conditions :
loop
Printing the Odd numbers using For loop :
1
3
5
7 is odd
8 is divisible by 4
9 has 1 digit

C:\Users\SHREEE\go>
```

Result : Sucessfully Executed the Program.

CHAPTER – 4

4.1 Write a Basic Program On Arrays and Slices and Perform all Operations on The arrays in Go language.

Description :

1. Arrays plays an important role in manipulating the and handling the huge amount of a data of an same type .
2. They store a single type of an data in a array which can have an explicated declared the array length or implicated declared array length.
3. [. . .] ➔ this resembles the infinite length in that array.
4. Ex : var1 := [3]int{ 1,2,3 }
   Var2 := [. . .]int{ 1,2,3,4,5,6,7,8}
5. The main disadvantage in the arrays is they can hold only same datatype elements in the array.

Program - 1 :

```
package main


import ("fmt")


func main(){


        var arr1 = [3]int{1,2,3} // 3 indicates the length of an array

        arr2 := [5]int{4,5,6,7,8}


        arr3 := [...]string{"Volvo", "BMW", "Mercendes", "Aadhipurush",
"SkyScrapper"} // [...] => indicates unlimited length in the array


        fmt.Printf("Type of an array : %T, \n Values in the array are : %v", arr1,
arr1)
```

```
fmt.Printf("Type of an array : %T, \n Values in the array are : %v", arr3, arr3)

// Performing the Slicing Operations
fmt.Println("\nElement present at the position 3 is in arr2 variable : ", arr2[3])

// Manipulating the elements in the array
fmt.Println("List of all Elements in arr2 are : ", arr2)
fmt.Println("Element present in position 2 is : ", arr2[2])
arr2[2] = 500
fmt.Println("Now Element present in position 2 is : ", arr2[2])

// Special Type in Array Declaration
array := [...]int{50:23, 12:100} // i.e; element 23 is placed at 50th position in array
// element 100 is placed at 12th position in the array
fmt.Printf("Type of an array : %T, \n Values in the array are : %v", array, array)

fmt.Println("\nLength of an array is : ", len(array))
fmt.Println("\n Capacity of an array is : ", cap(array))

// 2 dimensional Array
TwoD := [3][3]int{ {1,2,3}, {4,5,6}, {7,8,9} }
fmt.Printf("\n Type of an 2D array is : %T ", TwoD)
```

```
        fmt.Println("\n Elements in 2D array are : ", TwoD)

}
```

Program – 2:

```
// _Slices_ are an important data type in Go, giving
// a more powerful interface to sequences than arrays.
package main
import "fmt"
func main() {
        // Unlike arrays, slices are typed only by the
        // elements they contain (not the number of elements).
        // To create an empty slice with non-zero length, use
        // the builtin `make`. Here we make a slice of
        // `string`s of length `3` (initially zero-valued).
        s := make([]string, 3)
        fmt.Println("emp:", s)

        // We can set and get just like with arrays.
        s[0] = "a"
        s[1] = "b"
        s[2] = "c"
        fmt.Println("set:", s)
        fmt.Println("get:", s[2])
```

```
// `len` returns the length of the slice as expected.
fmt.Println("len:", len(s))

// In addition to these basic operations, slices
// support several more that make them richer than
// arrays. One is the builtin `append`, which
// returns a slice containing one or more new values.
// Note that we need to accept a return value from
// `append` as we may get a new slice value.
s = append(s, "d")
s = append(s, "e", "f")
fmt.Println("apd:", s)

// Slices can also be `copy`'d. Here we create an
// empty slice `c` of the same length as `s` and copy
// into `c` from `s`.
c := make([]string, len(s))
copy(c, s)
fmt.Println("cpy:", c)

// Slices support a "slice" operator with the syntax
// `slice[low:high]`. For example, this gets a slice
// of the elements `s[2]`, `s[3]`, and `s[4]`.
l := s[2:5]
fmt.Println("sl1:", l)
```

```
	// This slices up to (but excluding) `s[5]`.
	l = s[:5]
	fmt.Println("sl2:", l)
	// And this slices up from (and including) `s[2]`.
	l = s[2:]
	fmt.Println("sl3:", l)

	// We can declare and initialize a variable for slice
	// in a single line as well.
	t := []string{"g", "h", "i"}
	fmt.Println("dcl:", t)
	// Slices can be composed into multi-dimensional data
	// structures. The length of the inner slices can
	// vary, unlike with multi-dimensional arrays.
	twoD := make([][]int, 3)
	for i := 0; i < 3; i++ {
		innerLen := i + 1
		twoD[i] = make([]int, innerLen)
		for j := 0; j < innerLen; j++ {
			twoD[i][j] = i + j
		}
	}
	fmt.Println("2d: ", twoD)
}
```

Output - 1:

Command Prompt

```
C:\Users\SHREEE\go>Arrays
Type of an array : [3]int,
 Values in the array are : [1 2 3]Type of an array : [5]string,
 Values in the array are : [Volvo BMW Mercendes Aadhipurush SkyScrapper]
Element present at the position 3 is in arr2 variable :  7
List of all Elements in arr2 are :  [4 5 6 7 8]
Element present in position 2 is :  6
Now Element present in position 2 is :  500
Type of an array : [51]int,
 Values in the array are : [0 0 0 0 0 0 0 0 0 0 0 100 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 23]
Length of an array is :  51

 Capacity of an array is :  51

 Type of an 2D array is : [3][3]int
 Elements in 2D array are :  [[1 2 3] [4 5 6] [7 8 9]]

C:\Users\SHREEE\go>
```

Output – 2:

Command Prompt

```
Microsoft Windows [Version 10.0.19042.867]
(c) 2020 Microsoft Corporation. All rights reserved.

C:\Users\SHREEE>cd go

C:\Users\SHREEE\go>dir
 Volume in drive C has no label.
 Volume Serial Number is 8EEA-E27C

 Directory of C:\Users\SHREEE\go

14-10-2022  10:58 PM    <DIR>          .
14-10-2022  10:58 PM    <DIR>          ..
09-10-2022  04:03 PM         1,970,688 Arrays.exe
09-10-2022  04:03 PM             1,398 Arrays.go
14-10-2022  10:58 PM         1,953,792 arrays2.exe
14-10-2022  10:57 PM               562 arrays2.go
22-09-2022  08:37 PM         1,963,520 control_structures.exe
22-09-2022  08:35 PM             3,267 control_structures.go
18-09-2022  03:15 PM             1,131 Datatypes.go
14-10-2022  10:58 PM         1,955,840 slice.exe
14-10-2022  10:57 PM             2,356 slice.go
17-08-2022  08:07 PM                88 test.go
17-08-2022  08:18 PM               347 variable.go
              11 File(s)      7,852,989 bytes
               2 Dir(s)  127,862,251,520 bytes free

C:\Users\SHREEE\go>slice
emp: [  ]
set: [a b c]
get: c
len: 3
apd: [a b c d e f]
cpy: [a b c d e f]
sl1: [c d e]
sl2: [a b c d e]
sl3: [c d e f]
dcl: [g h i]
2d:  [[0] [1 2] [2 3 4]]

C:\Users\SHREEE\go>
```

Result : Sucessfully Executed the program.

CHAPTER – 5

5.1 Apply Various types of functions in Go Language.

Description :

1. Functions play an important role in a developer life or any application.
2. They help in reducing the code.
3. Once we write a function we can reuse that function as many times we want in the application or program.
4. Functions will have the return type and no.of parameters should pass to it.
5. In go language the functions can return multiple values at time .
6. **Syntax :**

```
func name(variable datatype, variable datatype)
function_return_type{
    Body of the Function
    ... => means Ellipsis operator
}
```

Program :

```
package main


import "fmt"

import "strings"


func main(){

    x := 10

    y := 20


    z := simple_add(x,y)

    fmt.Println(" Addition : ", z)
```

```
u1, u2, u3 := multiple_return()
fmt.Println(" Book Number : ", u1)
fmt.Println(" Book Name : ", u2)
fmt.Println(" Book Cost : ", u3)

// Anonymous Function
Anon := func(a, b, c int) int{
        fmt.Println()
        fmt.Println(" This Is an Anonymous Function")
        return a+b+c
}
fmt.Println("Arithmetic : ", Anon(1,2,3))

cs := vardiac_con("VRSEC", "It", "Cse", "Ece", "Civil", "Mech")
fmt.Println("Concatination Of Strings : ", cs)

fact := recursive_fact(10)
fmt.Println("Factorial of 10 is : ", fact)

defer defer_end()

r1 := special(10, inc)
r2 := special(100, dec)
fmt.Println("r1 value : ", r1);
```

```
        fmt.Println("r2 value : ", r2);



}

func simple_add(a int, b int) int{
        fmt.Println(" This Is a Simple Function ")
        ans := a + b

        return ans
}

func multiple_return() (int, string, float64){
        fmt.Println()
        fmt.Println("This function Returns Multiple Values at a Same Time")

        book_no := 38
        book_name := "Simulated Reality"
        book_cost := 480.95

        return book_no, book_name, book_cost
}

func vardiac_con(elements ...string) string{
        fmt.Println()
```

```
	fmt.Println(" This is an vardiac Function ")

	concat := strings.Join(elements, " $ ")
	return concat
}

func recursive_fact(a int) int{
	fmt.Println()
	fmt.Println(" This is an Recursive Function")

	if a == 0 || a == 1{
		return 1
	} else{
		return a*recursive_fact(a-1)
	}
}

func defer_end() {
	fmt.Println()
	fmt.Println(" This is a Defer Function Call ")

	fmt.Println("After The Main Method The Defer Statement Will Execute")
}

func inc(x int) int{
```

```
	x++
	return x
}

func dec(x int) int{
	x--
	return x
}

func special(x int, f func(int) int) int{
	fmt.Println()
	fmt.Println(" This is a Function as a parameter to Another function ")
	r := f(x)
	return r
}

/*

func name(variable datatype, variable datatype) function_return_type{
	Body of the Function
	... => means Ellipsis operator
}

*/
```

Output :

Command Prompt

```
Microsoft Windows [Version 10.0.19042.867]
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C:\Users\SHREEE>cd go

C:\Users\SHREEE\go>go run Functions.go
 This Is a Simple Function
 Addition :  30

This function Returns Multiple Values at a Same Time
 Book Number :  38
 Book Name :  Simulated Reality
 Book Cost :  480.95

 This Is an Anonymous Function
Arithmetic :  6

 This is an vardiac Function
Concatination Of Strings :  VRSEC $ It $ Cse $ Ece $ Civil $ Mech

 This is an Recursive Function

 This is an Recursive Function

 This is an Recursive Function

 This is an Recursive Function

 This is an Recursive Function

 This is an Recursive Function

 This is an Recursive Function

 This is an Recursive Function

 This is an Recursive Function

 This is an Recursive Function
Factorial of 10 is :  3628800

 This is a Function as a parameter to Another function

 This is a Function as a parameter to Another function
r1 value :  11
r2 value :  99

 This is a Defer Function Call
After The Main Method The Defer Statement Will Execute
```

Result : Sucessfully Executed the program.

CHAPTER – 6

6.1 implement the Below List of Programs in Go language.

1) Write a go program weather the given string is palindrome or not.
2) Write a go program to display the given numbers in a Ascending order.
3) Write a Go program by using switch keyword to perform a arithmatic operations.
4) Write a Go program weather the given is Armstrong or not.
5) Write a go program by using a function keyword.

Program – 1:

```
package main
import "fmt"
func main(){
	var ustr string

	fmt.Print("Enter ant String as an Input : ")
	fmt.Scanln(&ustr)

	reversestr := ""

	for i := len(ustr)-1; i >= 0; i--{
		reversestr += string(ustr[i])
	}

	for i := range(ustr){
```

```
            if ustr[i] != reversestr[i]{
                fmt.Println(" Given String is not an palindrome string ")
                break
            }
        }
        fmt.Println(" Given string is an palindrome string ")
}
```

Output :

```
Command Prompt
Microsoft Windows [Version 10.0.19042.867]
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C:\Users\SHREEE>cd go

C:\Users\SHREEE\go>go run Palindrome_String.go
Enter ant String as an Input : atta
 Given string is an palindrome string
```
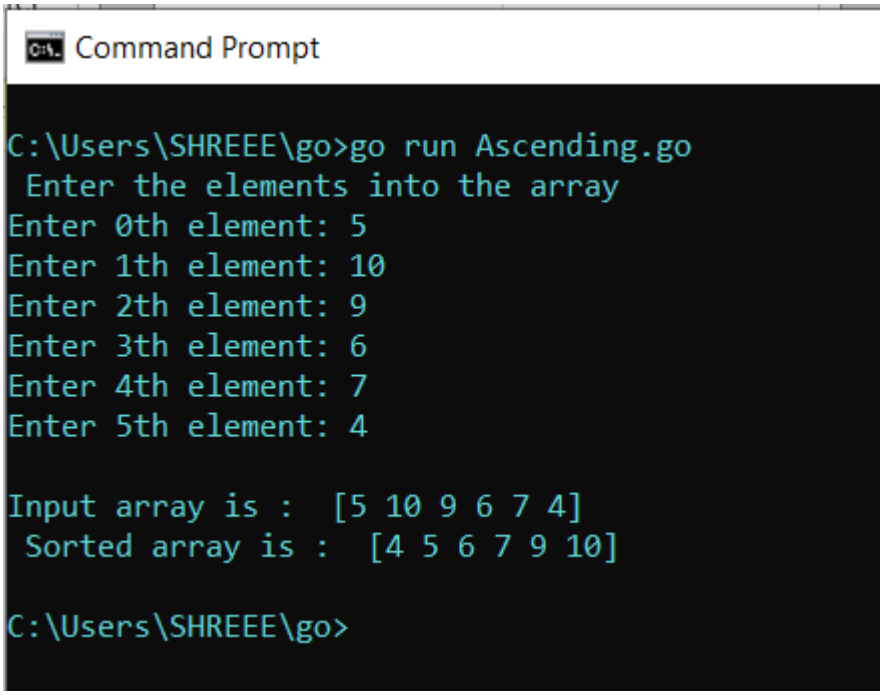

Program – 2:

```
package main


import "fmt"
import "sort"


func main(){
        array := [6]int{}
```

```
        fmt.Println(" Enter the elements into the array ")
        for i := 0; i < 6; i++{
          fmt.Printf("Enter %vth element: ", i)
    fmt.Scanln(&array[i])
        }

        fmt.Println("\nInput array is : ", array)

        sort.Ints(array[:])
        fmt.Println(" Sorted array is : ", array)
}
```

Output :



Program – 3:

```
package main
import "fmt"
import "os"

func main(){
	var a,b, choice int64
	fmt.Print("Enter the 1st Number : ")
	fmt.Scanln(&a)
	fmt.Print("Enter the 2nd Number : ")
	fmt.Scanln(&b)

	for true{
		fmt.Println(" \nEnter 1 for Addition ")
		fmt.Println(" Enter 2 for Subraction ")
		fmt.Println(" Enter 3 for Multiplication")
		fmt.Println(" Enter 4 for Division")
		fmt.Println(" Enter 5 for to exit the program")

		fmt.Print("\n Enter your Choice : ")
		fmt.Scanln(&choice)

		switch choice{
		case 1:
			fmt.Println(" Addition of Given Numbers are : ", a+b)
```

```
            case 2:
                fmt.Println(" Subraction of Given Numbers are : ", a-b)

            case 3:
                fmt.Println(" Multiplication of Given Numbers are : ", a*b)

            case 4:
                fmt.Println(" Division of Given Numbers are : ", a/b)

            case 5:
                os.Exit(0)

            default:
                fmt.Println(" Invalid Input ")
            }
        }
}
```

Output :

Command Prompt

```
C:\Users\SHREEE\go>go run Switch_Arthimatic.go
Enter the 1st Number : 12
Enter the 2nd Number : 2

Enter 1 for Addition
 Enter 2 for Subraction
 Enter 3 for Multiplication
 Enter 4 for Division
 Enter 5 for to exit the program

 Enter your Choice : 1
 Addition of Given Numbers are :  14

Enter 1 for Addition
 Enter 2 for Subraction
 Enter 3 for Multiplication
 Enter 4 for Division
 Enter 5 for to exit the program

 Enter your Choice : 2
 Subraction of Given Numbers are :  10

Enter 1 for Addition
 Enter 2 for Subraction
 Enter 3 for Multiplication
 Enter 4 for Division
 Enter 5 for to exit the program

 Enter your Choice : 3
 Multiplication of Given Numbers are :  24

Enter 1 for Addition
 Enter 2 for Subraction
 Enter 3 for Multiplication
 Enter 4 for Division
 Enter 5 for to exit the program

 Enter your Choice : 4
 Division of Given Numbers are :  6

Enter 1 for Addition
 Enter 2 for Subraction
 Enter 3 for Multiplication
 Enter 4 for Division
 Enter 5 for to exit the program

 Enter your Choice : 5

C:\Users\SHREEE\go>
```

Program – 4:

```
package main

import "fmt"

func main(){
	var arm int
	fmt.Print(" Enter Any Number : ")
	fmt.Scanln(&arm)

	temp := arm
	sum := 0

	for arm > 0{
		rem := arm%10
		sum += (rem*rem*rem)
		arm = arm/10
	}

	if sum == temp{
		fmt.Println(" Given Number is an Armstrong Number ")
	}else{
		fmt.Println(" Given Number is not an Armstrong Number ")
	}
}
```

Output :

```
Command Prompt

C:\Users\SHREEE\go>go run Arnstrong.go
 Enter Any Number : 173
 Given Number is not an Armstrong Number

C:\Users\SHREEE\go>go run Arnstrong.go
 Enter Any Number : 174
 Given Number is not an Armstrong Number

C:\Users\SHREEE\go>go run Arnstrong.go
 Enter Any Number : 371
 Given Number is an Armstrong Number

C:\Users\SHREEE\go>
```

Program – 5:

```
package main

import "fmt"


func Simple(x int, y int) int{

	fmt.Println(" This is an Simple Function")

	return x+y

}


func main(){

	result := Simple(10,99)

	fmt.Println(" Addition of 2 Numbers : ", result)

}
```

Output :

```
Command Prompt

C:\Users\SHREEE\go>go run Simple_Function.go
 This is an Simple Function
 Addition of 2 Numbers :  109

C:\Users\SHREEE\go>
```

Result : Successfully executed all programs.

CHAPTER – 7

7.1 Implement maps associative datatype in go language.

Description :

1. In go language map datatype is a built in datatype and similar to the dictionary in python.
2. It consists of key – value pair and each pair is an item in map
3. All keys must be in same datatype and All values must be in same datatype in a map.
4. To create an empty map, use the builtin function in go make(map[key-type]val-type).
5. Set key/value pairs using typical name[key] = val syntax.
6. Get a value for a key with name[key] .

Program :

```
package main

import "fmt"

func main() {

   m := make(map[string]int) //creating a map with key value pair

   // Adding Key value Pairs to Map

   m["Age"] = 20

   m["Roll"] = 100

   fmt.Println("Initial Map :", m)

   v1 := m["Age"]

   fmt.Println("Value of Age in Map : ", v1)

   fmt.Println("len of an Map :", len(m))

   delete(m, "Roll")

   fmt.Println("Deleting Roll key value pair in map :", m)
```

```
    _, prs := m["Roll"]
    fmt.Println("Roll Value :", prs)
    // Another way of creating a map
    n := map[string]int{"EmpID": 45, "Age": 25}
    fmt.Println("Employee map:", n)
}
```

Output :

```
C:\Users\SHREEE\go>go run Maps.go
Initial Map : map[Age:20 Roll:100]
Value of Age in Map :  20
len of an Map : 2
Deleting Roll key value pair in map : map[Age:20]
Roll Value : false
Employee map: map[Age:25 EmpID:45]

C:\Users\SHREEE\go>go run Maps.go
```

Result : Sucessfully Executed the Program .

CHAPTER – 8

8.1 implement structures concepts and it's methods and interface Concepts in go language.

Description :

1. Structures in go are collection of fields and they help in grouping the datatypes together.
2. When ever you use the structure object in a function you return safely a pointer to the variable .

   Syntax :

   ```
   type  structure – name  struct {
           variable    datatype
            variable   datatype
   }

   // accessing the variable in a structure
   Struct – object :=  structure – name { variable : value, variable : value }
   Struct – object.variable =  value
   ```

3. It can also handles the functions in go language.
4. We can use the structure variable inside the functions by using the below syntax it takes structure object as a parameter.

   Syntax :

   ```
   func  (struct-object   *struct-name)   function-name(  )  return type {

   // Body of the function

   }
   ```

5. Interfaces are collection of method signatures together.
6. They are like a run time polymorphism in go language.
7. We can define the method signature in a interface and we can implement different logics under a same method signature.

   Syntax :

```
type  interface – name  interface {
        method – name   returnType
        method – name   returnType
}
```

Program – 1:

```
package main
import "fmt"
type person struct {
   Name string
   Age  int
}

func newPerson(name string) *person {
   p := person{Name: name}
   p.Age = 42
   return &p
}
func main() {
   fmt.Println("directly give the values to the struct : ", person{"Bob", 20})

   fmt.Println("giving the values by mapping the variable names in the struct :
", person{Name: "Alice", Age: 30})

   fmt.Println("giving only one value to the struct : ", person{Name: "Fred"})
```

```
    fmt.Println("Another way of giving values to the struct : ", &person{Name: "Ann", Age: 40})


    fmt.Println("New Person Function : ", newPerson("Jon"))
    s := person{Name: "Sean", Age: 50}
    fmt.Println(" Initial Structure : ", s)
    fmt.Println("Getting the Name value in struct using object : ", s.Name)
    sp := &s
    fmt.Println("Age of an Employee : " , sp.Age)
    sp.Age = 51
    fmt.Println(" Change in Age value in Struct : ", sp.Age)
}
```

Output :

```
C:\Users\SHREEE\go>go run Structures.go
directly give the values to the struct :  {Bob 20}
giving the values by mapping the variable names in the struct :  {Alice 30}
giving only one value to the struct :  {Fred 0}
Another way of giving values to the struct :  &{Ann 40}
New Person Function :  &{Jon 42}
 Initial Structure :  {Sean 50}
Getting the Name value in struct using object :  Sean
Age of an Employee :  50
 Change in Age value in Struct :  51
```

Program – 2:

```
package main

import "fmt"

type rect struct {
   width, height int
}

func (r *rect) area() int {
   return r.width * r.height
}

func (r rect) perim() int {
   return 2*r.width + 2*r.height
}

func main() {
   r := rect{width: 10, height: 5}

   fmt.Println("area of a Rectangle : ", r.area())
   fmt.Println("perimeter of a Rectangle :", r.perim())

   rp := &r
   rp.width = 20
```

```
    rp.height = 50
    fmt.Println("\narea of a Rectangle 2 : ", rp.area())
    fmt.Println("perim of a Rectangle 2 :", rp.perim())
}
```

Output :

```
C:\Users\SHREEE\go>go run Struct_Methods.go
area of a Rectangle :  50
perimeter of a Rectangle : 30

area of a Rectangle 2 :  1000
perim of a Rectangle 2 : 140

C:\Users\SHREEE\go>
```

Program – 3 :

```
package main

import (
    "fmt"
    "math"
)

type geometry interface {
    area() float64
    perim() float64
}
```

```
type rect struct {
   width, height float64
}
type circle struct {
   radius float64
}

func (r rect) area() float64 {
   return r.width * r.height
}
func (r rect) perim() float64 {
   return 2*r.width + 2*r.height
}

func (c circle) area() float64 {
   return math.Pi * c.radius * c.radius
}
func (c circle) perim() float64 {
   return 2 * math.Pi * c.radius
}

func measure(g geometry) {
   fmt.Println("Interface Object : ", g)
   fmt.Println("Area of the Shape : ", g.area())
   fmt.Println("Perimeter of the Shape : ", g.perim())
```

```
    fmt.Println()
}

func main() {
    r := rect{width: 3, height: 4}
    c := circle{radius: 5}

    measure(r)
    measure(c)
}
```

Output :

```
C:\Users\SHREEE\go>go run Interfaces.go
Interface Object :  {3 4}
Area of the Shape :  12
Perimeter of the Shape :  14

Interface Object :  {5}
Area of the Shape :  78.53981633974483
Perimeter of the Shape :  31.41592653589793


C:\Users\SHREEE\go>
```

Result : Sucessfully executed all programs.