



Swift Programming

Section 1 – Building block , I/O, Operators & Expressions

- Variable
- Data Type
- Input and Output
- Initialization Constant
- Escape Sequence
- Arithmetic Operator
- Relational & Logical Operator Increment & Decrement Operator
- Assignment Operator
- Conditional Expression
- Type Conversion

*1. Write a program to print given format using printf function.

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*2. Write a program to find out simple interest (SI).

*3. Write a program to find gross salary (Hint :-GS=BS+DA+TA).

*4. Write a program for swapping of two integer variables using third variable.

*5. Write a program for swapping of two integer variables Without using third variable.

*6. Write a program to print last digit of a given number.

*7. Write a program to calculate Compound Interest

*8. Write a program to swap two numbers.

#1. Write a program to find out square of given number

#2. Write a program to find out area of circle

#3. Write a program accept 5 subject marks (Hint P=67, C=87, M=90, H=98, E=88) and calculate total marks and percentage.

#4 Write a program accepts three numbers from user and calculate average of given three numbers.

#5. Write a program to accepts an amount in rupees (Hint Rs4567) and find out how many currency of Rs 2000 required. Also find remaining amount.

#6 Write program to find power of a number using pow function

#7 Write a program to convert temperature from degree Fahrenheit to Celsius

#8 Write a program to convert days into years, weeks and months.

#9 Write a program to flip bits of a binary number using bitwise operator.

#10. Find sum of first , third and fifth digit of 6 digit number.

Section 2 – Flow Control (Conditional Statements)

- If
- If-Else
- Else-If
- Nested If-Else
- Ternary operator
- Switch
- Optional type

*1. Write a program to accept a number from user and check given number is even or odd.

*2. Write a program to accept two numbers from user and calculate first no is divisible by second or not.

*3. Write a program to accept three numbers from user and calculate biggest number out of three numbers.

*4. Write a program to calculate whether character is in lowercase or uppercase.

*5. Write a program to input basic salary of an employee and calculate its Gross salary according to following rules:

Basic Salary \leq 10000 : HRA = 20%, DA = 80%

Basic Salary \leq 20000 : HRA = 25%, DA = 90%

Basic Salary $>$ 20000 : HRA = 30%, DA = 95%

Gross Salary = Basic Salary + HRA + DA

*6. Write a program to show day of week according to user input by using switch case.

*7. Write a program to perform all arithmetic operations according to user choice (for ex-for addition press +...) by using switch case.

*8. Write a program to find maximum between two numbers.

*9. Write a program to find maximum between three numbers using if-else and ternary operator.

*10. Write a program to calculate sum of digits of a number of three digit number using if-else

*11. Write a "Bonus Distribution Program" using logical operators. Bonus will be given to all those employees who have salary less than 20000 and tenure is more than 3 years.

*12. Write a code (using nested switch case) to suggest a diet plan (calories) to a consumer on behalf of inputs (gender and food time).

#1. Write a program that accepts the age of person, find out the person is eligible for voting or not.

#2. Write a program that accepts a number from user and find whether it is positive or negative or zero.

#3. Write a program to calculate whether year is leap year or not.

#4. Write a program that accepts five subjects' marks from user and calculate the total marks then calculate Percentage. Display message according to following condition:

Percentage ≥ 60 then print message Grade A

Percentage ≥ 50 then print message Grade B

Percentage ≥ 40 then print message Grade C

Percentage < 40 then print message Grade D

#5. Write a program for generating electricity Bill. Accept last month unit and current month unit from user, then calculate and print bill amount according to following condition:

0-150 charges 4 rs/unit

151-300 charges 6 rs/unit

301-500 charges 8rs/unit

>500 charges 10rs/unit

#6. Write a program to show name of month . Ask user to enter between 1 and 12. Use switch case.

#7. Write a program that accepts a character and check given character is vowel or not by using switch case.

#8. Write a program to check whether a number is even or odd using switch case.

#9. Write a program to find the greatest of four numbers entered by the user.

#10. Write a program to calculate the income tax of an employee.

The tax slabs according to annual salary are :

upto rs.300000 tax is 0%

from rs.300000 to rs. 500000 tax is 10%

from rs.500000 to rs. 1000000 tax is 15%

more than 100000 tax is 20%

Note: 250000 is exempted from tax criteria

#11. Write a code for call center (using nested switch case). E,g, 1 for prepaid, 2 for post paid. If 1 selected then show all the options for prepaid.

Section 3 – Flow Control(Loops)

- While Loop
- Repeat-While Loop
- Break & Continue
- For Loop

*1. Write a program to print "Code Better" five times by using loop.

*2. Write a program to print n natural number.

*3. Take any ten numbers from user and print sum and average of these numbers.

*4. Take any ten numbers from user and print sum and average of positive numbers.

*5. Take the numbers from user (until ten +ve numbers entered by the user), and print sum and average of these numbers.

- *6. Write a program to calculate factorial of a given number.
- *7. Write a program to calculate sum of digits of a number.
- *8. Write a program to find out reverse of a given number.
- *9. Write a program that accepts a number from user and check given number is Armstrong number or not.
- *10. Write a program to find LCM of two numbers.
 .e.g. LCM of 4 and 6 is 12
- *11. Write a program to find HCF of two numbers.
 .e.g. HCF of 16 and 24 is 8
- *12. Write a program that accepts a number from user and check given number is prime number or not.
- *13. Print Fibonacci series upto n terms 0,1,1,2,3,5,8,.....
- *14. Write a program to print given below patterns:

<pre> * * * * * * * * * * * * * * * </pre>	<pre> * * * * * * * * * * </pre>	<pre> A AB ABC ABCD ABCDE </pre>
<pre> * ** *** **** ***** ***** </pre>	<pre> * * * * * * * * * * * * * * * </pre>	<pre> 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 </pre>

- #1. Write a program to calculate square of numbers between 1-10
- #2. Write a program to calculate cube of numbers between m and n. Ask user to enter value of m and n.
- #3. Write a program to print table of any given numbers. . e.g table of 5 is 5, 10, 15,....,50
- #4. Write a program that accepts a number from user and check given number is palindrome number or not. e.g palindrome number is 16761.
- #5. Write a program that accepts a number from user calculate factor of a given number.
 .e.g. factors of 12 are 1,2,3,4,6,12
- #6. Write a program that accepts a number from user check given number is perfect number or not. A perfect number is whose sum of factors is wise of that numbers. e.g. factor of 6 are 1,2,3,6 then sum os 1+2+3+6=12
- #7. Write a program to accept N number from user and show how many number are even or odd.
- #8. Write a program to accept N number from user and check and print only Prime numbers.

- #9. Write a program to accept N number from user and check and print only Armstrong numbers.
- #10. Write a program to accept N number from user and check and print only palindrome numbers.
- #11. Write a program to calculate sum of given series: $1-2+3-4+5-6+7-8+\dots+n$.
- #12. Write a program to calculate sum of given series: $x + x^2 + x^3 + \dots + x^n$
- #13. Write a program to print given below patterns:

1 12 123 1234	5 54 543 5432 54321	5 4 3 2 1 5 4 3 2 1 5 4 3 2 1 5 4 3 2 1 5 4 3 2 1	1 1 2 1 2 3 1 2 3 4 1 2 3 4 5
1 1 1 1 2 1 1 3 3 1 1 4 6 4 1	* * * * * * * * * * * * * * * *	* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *	* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

#14. print first letter of your name using start pattern

Section 4 - Functions

- Function Types, Parameters, Declaration
- Call by value & Call by reference
- Scope, Visibility & Lifetime of Variable
- Recursion
- Closure

- *1. Write a program to find cube of any number using function.
- *2. Write a program to check whether a number is even or odd using functions.
- *3. Write a program to find sum of digits of a given number using recursion.
- *4. Write a program to check whether a number is palindrome or not using recursion.
- *5. Create a closure that return factorial of a number
- *6. Create a closure that return maximum element from array
- *7. Create a function that takes two arguments 1. Int, 2. Function type (Int) ->Int and return a tuple (Int, Int) containing cube of 1st argument and value returned by 2nd argument function on 1st argument

*8. Create a closure to find factorial of number and pass factorial closure to above function (2nd argument in problem no. 6) with input number n

#1. Write a program to check the prime number using function with argument and no return type.

#2. Write a program to calculate factorial using function with argument and with return type.

#3. Write a program to print all even or odd numbers in given range using recursion.

#4. Write a program to find LCM of two numbers using recursion.

#5. Write a program to print all natural numbers between 1 to n using recursion.

Section 5 - Array

- Array
- Nested array
- Pass Array to Function, Return Array from function

*1. Write a program to read and print elements of array.

*2. Write a program to find sum of all array elements

*3. Write a program to find maximum and minimum element in an array

*4. Write a program to insert an element in an array.

*5. Write a program to add two matrices.

*6. Write a program to search an element in an array.

*7. Write a program to sort an array .

*8 Write a program to reverse elements of an array

#1. Write a program to count total number of even and odd elements in an array.

#2. Write a program to copy all elements from an array to another array.

#3. Write a program to count total number of duplicate elements in an array.

#4. Write a program to merge two array to third array.

#5. Write a program to sort array elements in ascending or descending order.

- #6. Write a program to multiply two matrices.
- #7. Write a program to check whether two matrices are equal or not.
- #8. Create an array of size 3x10 containing multiplication tables of the numbers 2,7 and 9, respectively.
- #9 Remove all duplicate occurring elements from array.
- #10 Write a program to print words representation of entered number. e.g. if entered number is 245983 then result should be Two Lac Forty Five Thousand Nine Hundred Eighty Three
- #11. Ask user to enter any four numbers between 1 to 9 and print all numbers made using combination of these four number. Do not repeat any digit in the same number.
- #12. Find 2nd highest number from and 2nd minimum from array of n elements.
- #13. Create a function that accept two Int arrays and return sum of all elements of both arrays
- #14. Create a function that accepts two tuples of type (Float,Int) and return $t1.0/t2.0 + t1.1*t2.1$

Section 6 - Tuple , Dictionary, Set

- *1. Create a dictionary to store student rollno (key) and name(value). store 5 pairs by default
- *2. Create a dictionary to store name_of_course (key) and duration_in_month(value). store 5 pairs by default
- *3. Declare tuple to store information about Book Title, Price, Auther, pageCount. Store information of any 4 books in an array and print as below.

Title	Price	Auther	Pages
-------	-------	--------	-------

Let US C	450	Kanitkar	338
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.....

- *4. Create a dictionary to store name of cricket teams according to their world rankings
- *5. Create a set of different movie star names. Perform these operations on the set
 - a. Try to add same name in the set. Is it possible ?
 - b. Display all the elements of the set
 - c. Remove the element at position 3
 - d. Check if a given name exist in the set

e. Display the total number of names in the set

#1. Create a dictionary to store fruitname (key) and fruit price(value). store 5 pairs by default

#2. Create a dictionary to store name_of_course (key) and duration_in_month(value). store 5 pairs by default

#3. Declare tuple to store information about Student name, course, semester, percent and display on screen

#4. Create dictionary to store name of states and 3 cities of each state

#5. Create a set of 10 numbers and perform these operations on the set

a. Sort the elements in ascending and descending order

b. Find the average of the elements

c. Identify the highest and the smallest element

d. Remove the smallest element in the set

f. Print the contents of the set

Section 7 - Object Oriented Programming

- Object oriented programming concepts
- Class , object, reference, methods
- initializers , self keyword
- Static variable
- Property types : lazy, stored , computed
- Property observers
- Array of objects, HAS-A relation
- ARC and memory management

*1. Create a class Rectangle with three data member (length, breadth & area).

Now also create method members

- inputValue() - to take input for length and breadth from user.
- calculateArea() - to calculate area of rectangle.
- showArea() - to display the area of rectangle.

*2. Create a class DemoArithmetic with three data member that are firstNo, secondNo and result .

In this class also create following method:

- a. inputValue() - to take input value from user for firstNo and secondNo
- b. addition() - to perform addition operation and store in result var
- c. subtraction() - to perform subtraction operation and store in result var
- d. multiplication() - to perform multiplication operation and store in result var
- e. divide() - to perform divide operation and store in result var
- f. show() - display value of result variable.

- *3. Create a class Student with data member(stuName, stuId, stuPercentage) to store the information of student And also create following method:
 - a. inputStuInformation() - to take information about student from user
 - b. outputStuInformation() - to display information of student
- *4. Create a class Addition with member function addition() with following given argument
 - a. three float
 - b array of integer
 - c two integer

- #1. Create a class Student with data member (stuId ,stuName ,stuPer)) by using following properties:
- a. Only parameterized constructor;
 - b. ShowStuInformation() method - display the information of student.
 - c. Create three student object and call ShowStuInformation method

- #2. Create class Employee with variables name, id, salary.
- Create default and parameterized initializer.
 - Create initializer for id and salary only.
 - Make name optional type.
 - Use self keyword in all initializers

- #3. Create class Farmer with variables (name, crop, earning).
- Create default and parameterized initializer.
 - Create display function
 - Compare earnings of two Farmers and print name and crop of farmer who earns more.

- #4. Create class Circle with variable radius.
- Create default init to set radius=1.
 - Create parameterized initializer.
 - Create display function to display radius and area.
 - Create function isBiggerThan(other : Circle) -> Bool
 - Create Two objects and call all the above functions

- #5. Create class BankAccount with data members accountNo, name, balance.
- Create display() method.
 - Create another method deposit(amount:Float) which add amount value to balance
 - Create withdraw(amount:Float) method which subtract amount from balance.
 - Store 5 BankAccount Information in an Array and display all records. Ask user to select choice from below and perform operation
 1. Display account detail by account number
 2. Deposit amount in account by account number
 3. Withdraw amount in account by account number
 4. Delete account by account number.

Section 8 - Inheritance and Protocols

- Introduction, Types
- Initializers in inheritance, super keyword
- Method overriding

- Protocols
- Runtime Polymorphism

*1. Create class Student with variable (name, course, dateOfBirth)

- create SchoolStudent class with variable (fees) and inherit class Student
- create CollegeStudent with variable(sem and fees) and inherit class Student
- create class PGStudent with variable(mainSubject, percent) and inherit CollegeStudent
- add default and parameterized initializer in all classes

*2. Create class Employee(id, name, salary) and add display function

- create class PartTimeEmployee with variable(hoursWorked , hourlyRate) and inherit class Employee. Add calculateSalary() function to calculate salary as salary = hourlyRate * hoursWorked
- create class FullTimeEmployee with variables(basic, da, pf) and Add calculateSalary() function to calculate salary as salary = basic + da - pf
- add default and parameterized initializer in all classes
- Create a global function getTax(emp:Employee) which accept Employee object in argument and calculate and print income tax on employee salary(12.5% of salary)
- Also try to pass Objects of PartTimeEmployee and FullTimeEmployee to getTax() method

*3. Create class BankAccount with variables (accountNo, balance).

- Add default and parameterized init.
- Add display method
- Add depositAmount(a:Float) method to increase balance
- Add withdrawAmount(a:Float) to subtract from balance

Create class SavingAccount with variable(customerName,homeAddress) and Inherit class BankAccount.

- Add static variable minimumBalance.
- Add display method
- override withdrawAmount(a:Float) to check minimumBalance

Create class CheckingAccount with variable(shopName, shopAddress) and Inherit class BankAccount.

- Add static variable overDraftLimit.
- Add display method
- override withdrawAmount(a:Float) to check overDraftLimit

Create an Array of BankAccount type and append 3 objects of SavingAccount type and 4 objects of CheckingAccount Type with default data. Display all account information on screen

#1. Create a class Bird with properties – name, habitat, food, feather color. Create a protocol FlyingStyle, which has a method fly (). Conform the protocol to Bird class and write code for the fly method.

#2. Create protocol Taxable with variables taxRate{get}, and function getTax()->Float

- create class Employee(id,name,salary) add display function. Implement Taxable protocol. Decide income taxRate 30% for salary above 10 lac, 20% for salary between 5 and 10 lac and 6% for salary below 5 lac
- create class Restaurant (restaurant name, Bill amount). add display and input function. decide GST 10% and implement Taxable protocol to getTax()

- create 2 object of Employee and 3 Obj of RestaurentBill and print total amount of tax on all 5 objects
- Create Global function that accept reference of type Taxable and print 5% of refund on tax applied.

Section 9 - Structure and Enum

- *1. Write a program to create, declare and initialize structure.
- *2. Write a program to store and print the roll no., name, age and marks of a student using structures.
- *3. Enter the marks of 5 students in Chemistry, Mathematics and Physics (each out of 100) using a structure named Marks having elements roll no., name, chem_marks, maths_marks and phy_marks and then display the percentage of each student.
- *4. Write a Program to add two distances in inch-feet system using Structure
- *5. Write a program for passing structures as function arguments and returning a structure from a function.
- *6. Write a program to declare, initialize enum.

#1. Write a program to create Book Details using structure

#2. Write a program to Calculate Difference between Two Time Periods

#3. Write a program to store and print the roll no., name, age, address and marks of 15 students using structure.

#4. Write a structure to store the roll no., name, age (between 11 to 14) and address of students (more than 10). Store the information of the students.

1 - Write a function to print the names of all the students having age 14.

2 - Write another function to print the names of all the students having even roll no.

3 - Write another function to display the details of the student whose roll no is given (i.e. roll no. entered by the user).

#5. Create a Array of structure objects to store six product details (pid, name, quantity, price). Print in Alphabetical order by product name

#6. Define a structure called Cricket which has following info – Player Name, Team Name, Batting average. Use initializer to initiate cricket structure. Declare an array cricket players with 10 elements and display the names of the players in order of their batting average.

Section 10 - Extension , Operator Function and Generics

- *1. Create extension of Double to find how many digits before decimal point
- *2. Create extension of Int to get middle digit

- #1. Implement Swapping of two values using Generics
- #2. Implement Queue operations using Generics

Section 11 - Strings

- Declaring Strings in
- Strings Input and Output functions
- String Comparison
- String Functions

- *1. Write a program to find length of a string.
- *2. Write a program to take a two as an input from the user . Confirm that the strings are equal.
- *3. Write a program to find total number of alphabets, digits or special character in a string.
- *4. Write a program to convert lowercase string to uppercase.
- *5. Write a program to find reverse of a string.

- #1. Write a program to convert string into lowercase without any library function.
- #2. Write a program to accept a string and check if it is palindrome or not?
- #3. Write a program to count total number of vowels and consonants in a string.
- #4. Write a program to find first occurrence of a character in a given string.
- #5. Write a program to toggle case of each character of a string.

Mini Project Ideas

1. Create a Student Management System to store , delete, update list records of student.
Store rollno, name, course, semester , percentage
2. Create BankAccount Management App to store , delete, update, list, deposit, withdraw, search records of Bank Account. Store accNo, customer name, balance, account type
3. Create CodeBetter enquiry system to store, delete, update, list, search enquiry details.
Store enquiry details like candidate name, contact, address, course selected, course fee