EXPERIMENT – 3

JavaScript Arrays & Functions

Aim: To create simple applications using the various JS Control Structures, arrays and Functions.

List of Activities:

1. Implement the below-given software design using JS.This algorithm finds all 3-digit Armstrong numbers.

> **Step 1.** [INITIALIZE N WITH THE FIRST 3-DIGIT NUMBER]
> $N \leftarrow 100$
> **Step 2.** REPEAT STEPS 3 THROUGH 10 UNTIL N > 999
> **Step 3.** [INITIALIZE S, WHICH HOLDS THE SUM OR
> THE CUBES]
> $S \leftarrow 0$
> **Step 4.** $M \leftarrow N$ [THIS IS TO MAKE A COPY OR N]
> **Step 5.** REPEAT STEP 6 THROUGH STEP 8 WHILE M > 0
> **Step 6.** COMPUTE REM $\leftarrow$ REMAINDER OF (M/10)
> **Step 7.** COMPUTE S $\leftarrow$ S + REM*REM*REM
> **Step 8.** COMPUTE M $\leftarrow$ INTEGER PART OF (M/10)
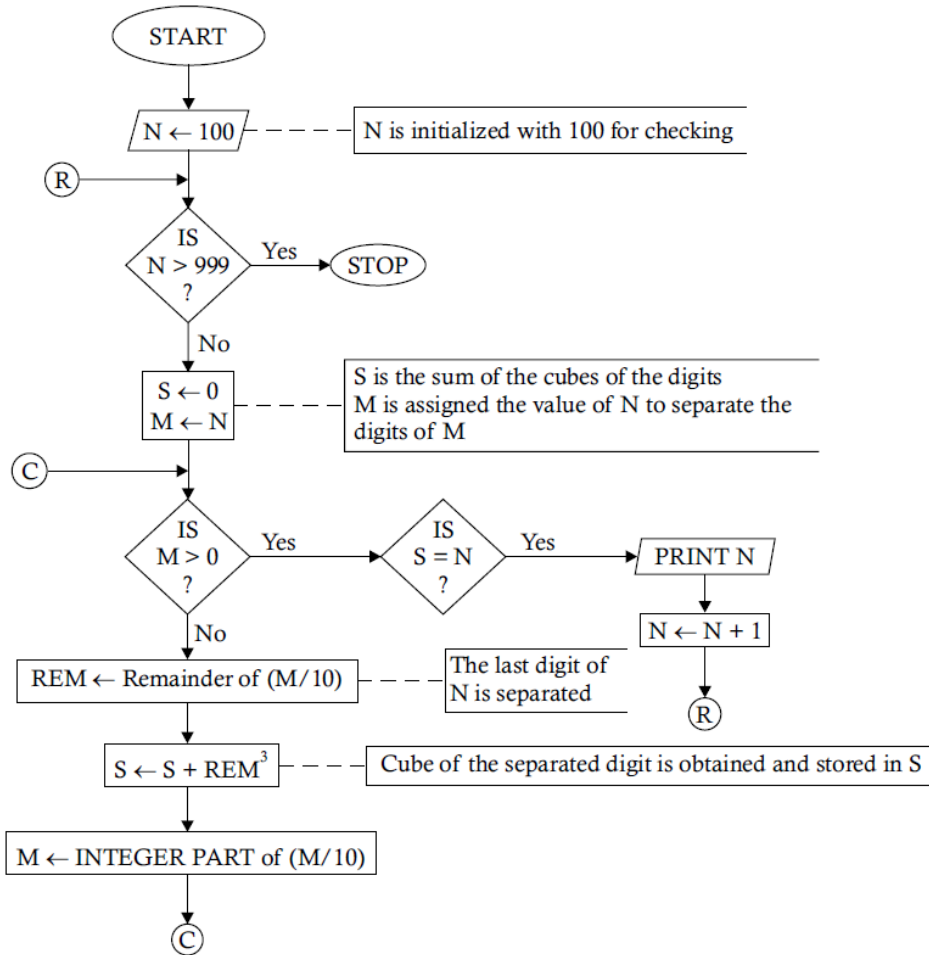> **Step 9.** IF S = N
> THEN PRINT N
> END-IF
> **Step 10.** [INCREMENT N TO TAKE THE NEXT NUMBER]
> COMPUTE N $\leftarrow$ N + 1
> END-REPEAT
> **Step 11.** END

Flowchart:

- START
- N ← 100 ----- N is initialized with 100 for checking
- (R)
- IS N > 999 ? — Yes → STOP
- No
- S ← 0, M ← N ----- S is the sum of the cubes of the digits / M is assigned the value of N to separate the digits of M
- (C)
- IS M > 0 ? — Yes → IS S = N ? — Yes → PRINT N
- No (from S = N) → N ← N + 1 → (R)
- No (from M > 0) → REM ← Remainder of (M/10) ----- The last digit of N is separated
- S ← S + REM³ ----- Cube of the separated digit is obtained and stored in S
- M ← INTEGER PART of (M/10)
- (C)

2. Develop a JS code to show how to find all even natural numbers that are divisible by 7 in a given range. Create suitable functions to achieve it.

   Task Analysis. We require two numbers that can serve as boundary values between all the desired numbers to be generated. If a number within the given range is divisible by 7, then it is printed. As the range may include many numbers, each of the numbers need not be accepted as input from the terminal because it will slow down the whole process. We can generate natural numbers one by one based on the lower range given, and then we test the divisibility by 7. A number is said to be divisible by 7 if it leaves no remainder when divided by 7. The input is the numbers forming the lower and the upper ranges between which we test all the numbers, including the numbers forming the ranges. A loop is required to perform the same task of divisibility checking with a newly generated number.

3. Write a JavaScript program that accepts a string as input and swaps the case of each character. For example if you input 'The Quick Brown Fox' the output should be 'tHE qUICK bROWN fOX'.

4. Develop a flowchart to show how to find out all the groups of three successive numbers under 1000 that have the property that the square of the middle number is greater by unity than the product of the other two numbers (for example, $18^2 = 17 \times 19 + 1$).

```
                    START

                    I ← 1
                    J ← 2
                    K ← 3

    R               L ← J*J
                    M ← I*K + 1

                    IS        Yes      PRINT I, J, K
                    L = M
                    ?         No

                                       I ← I + 1        IS          No     R
                                       J ← J + 1        K >
                                       K ← K + 1        998 ?

                                                        Yes

                                                        Exit
```