**Question**

A Special number is a number in which the sum of the factorial of its digits is equal to the number. Example: 145 ( 1! + 4! + 5! = 145 ). Thus, 145 is a Special number. Design a class Special to check if the given number is a Special number or not.

Some of the members of the class are given below:

Class name : Special

Data member/instance variable: n : integer to store number

Member functions/methods: Special( ) : default constructor

void read( ) : to accept the number int factorial(int x) : return the factorial of a number

boolean isSpecial( ) : checks for the special number by invoking the function factorial( ) and returns true if Special, otherwise returns false void

display( ) : displays the result with an appropriate message

Specify the class Special, giving details of the Constructor, void read( ), int factorial(int), boolean isSpecial( ) and void display( ). Define the main() function to create an object and call the member function according to enable the task.

**Algorithm**

Start

1. Define a class `Special` with the following instance variables:

- `n`: an integer to store the number.

2. Define a default constructor for the class `Special`:

- Initialize `n` to 0.

3. Define a method `read()` to read a number from the user:

- Print "Enter a number:".

- Read the number using a `Scanner` object and store it in `n`.

4. Define a method `factorial(int x)` to return the factorial of a number:

- If `x` is 0, return 1.

- Initialize `fact` to 1.

- Loop from 1 to `x`, multiplying `fact` by the loop index `i`.

- Return `fact`.

5. Define a method `isSpecial()` to check if the number is a Special number:

- Initialize `sum` to 0.

- Use a temporary variable `temp` set to `n`.

- While `temp` is greater than 0:

- Extract the last digit of `temp` and add its factorial to `sum`.

- Remove the last digit from `temp`.

- Return `true` if `sum` equals `n`, otherwise return `false`.

6. Define a method `display()` to display the result:

- If `isSpecial()` returns `true`, print that `n` is a Special number.

- Otherwise, print that `n` is not a Special number.

7. Define a static method `main()` to execute the program:

- Create an object of the class `Special`.

- Call `read()` to read the number from the user.

- Call `display()` to show the result.

End

**Variable Description**

|  |  |  |
| --- | --- | --- |
| **Variable** | **Data type** | **Purpose** |
| n | int | Stores number entered by the user |
| x | int | Number for which factorial is to be calculated |
| temp | int | Temporary variable to extract each digit |
| sum | int | Sum of all the factorials |
| fact | int | To hold the factorial of a number |
| digit | int | To store each digit |