**Aim:**

To understand and implement basic TypeScript programs such as a 'Hello World' application and a fully functional calculator.

### ****Requirements:****

* Node.js and npm installed.
* TypeScript compiler (tsc) installed via npm.
* Code editor like Visual Studio Code.

### ****Theory:****

TypeScript is a superset of JavaScript that adds static typing and object-oriented features to enhance code maintainability and reliability. It compiles to JavaScript and is widely used for front-end and back-end development.

Basic TypeScript programs include simple scripts like printing messages to the console and performing arithmetic operations. A calculator program demonstrates how TypeScript handles user inputs, functions, and control flow effectively.

### ****Code:****

#### **4.1 Hello World Program:**

1. Create a new TypeScript file hello.ts.
2. Write the following code:
3. console.log("Hello, World!");
4. Compile the TypeScript file using:
5. tsc hello.ts
6. Run the compiled JavaScript file:
7. node hello.js

#### **4.2 Fully Functional Calculator Program:**

1. Create a new TypeScript file calculator.ts.
2. Write the following code:
3. function add(a: number, b: number): number {
4. return a + b;
5. }
6. function subtract(a: number, b: number): number {
7. return a - b;
8. }
9. function multiply(a: number, b: number): number {
10. return a \* b;
11. }
12. function divide(a: number, b: number): number {
13. if (b === 0) {
14. throw new Error("Division by zero is not allowed.");
15. }
16. return a / b;
17. }
18. function calculator(): void {
19. const num1: number = parseFloat(prompt("Enter first number:") || "0");
20. const operator: string = prompt("Enter operator (+, -, \*, /):") || "+";
21. const num2: number = parseFloat(prompt("Enter second number:") || "0");
22. let result: number;
23. switch (operator) {
24. case '+':
25. result = add(num1, num2);
26. break;
27. case '-':
28. result = subtract(num1, num2);
29. break;
30. case '\*':
31. result = multiply(num1, num2);
32. break;
33. case '/':
34. result = divide(num1, num2);
35. break;
36. default:
37. throw new Error("Invalid operator");
38. }
39. console.log(`Result: ${result}`);
40. }
41. calculator();

### ****Observations:****

* The TypeScript code successfully compiled into JavaScript.
* The Hello World program printed the message correctly to the console.
* The calculator program successfully performed addition, subtraction, multiplication, and division.
* The program handled user input and executed based on the selected operator.

### ****Conclusion:****

TypeScript provides strong typing and better maintainability over JavaScript. Writing basic programs like 'Hello World' and a fully functional calculator helps in understanding TypeScript syntax, functions, and user interactions.