Ganpat University
॥ विद्यया समाजोत्कर्षः ॥
Institute of Computer Technology

Name: Tushar Panchal

En.No: 21162101014

Sub: CD(Compiler Design)

Branch: CBA

Batch:71

----------PRACTICAL 08----------

Implement Recursive Descent Parser for Given Grammar.

E –> T E'
E' –> + T E' | ε
T –> F T'
T' –> * F T' | ε
F –> (E) | a

✓ ***8.py :***

```c
#include <stdio.h>
#include <string.h>
#include <stdlib.h>

// Function declarations for each non-terminal
void E();
void E_();
void T();
void T_();
void F();

char input[100]; // Input string
int current = 0; // Pointer to traverse the input string

// Function to check the current character and move forward
void match(char expected) {
    if (input[current] == expected) {
        current++;
    } else {
```

```
        printf("Error: Unexpected character '%c' at position %d\n",
input[current], current);
        exit(1);
    }
}

// Non-terminal: E → T E'
void E() {
    T();
    E_();
}

// Non-terminal: E' → + T E' | ε
void E_() {
    if (input[current] == '+') {
        match('+');
        T();
        E_();
    }
    // ε-production: Do nothing and return
}

// Non-terminal: T → F T'
void T() {
    F();
    T_();
}

// Non-terminal: T' → * F T' | ε
void T_() {
    if (input[current] == '*') {
        match('*');
        F();
        T_();
    }
    // ε-production: Do nothing and return
}

// Non-terminal: F → ( E ) | a
void F() {
    if (input[current] == '(') {
        match('(');
        E();
        match(')');
    } else if (input[current] == 'a') {
        match('a');
    } else {
```

```
        printf("Error: Unexpected character '%c' at position %d\n",
input[current], current);
        exit(1);
    }
}

// Main function
int main() {
    printf("Enter the input string (end with '$'): ");
    scanf("%s", input);

    // Start parsing from the start symbol: E
    E();

    // Check if the entire input string has been consumed
    if (input[current] == '$') {
        printf("Success: The input string is accepted by the
grammar.\n");
    } else {
        printf("Error: Unconsumed input starting at position %d\n",
current);
    }

    return 0;
}
```

✓ ***Output :***

```
 pwsh  8  24ms
> gcc -o a .\8.c
 pwsh  8  646ms
> ls

        Directory: C:\Users\Tushar\Documents\SEM 7\CD\CODES\8


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a---          08-12-2024  06:55 PM           1869 c  8.c
-a---          08-12-2024  06:56 PM         122928    a.exe
-a---          08-12-2024  11:26 AM          87237    parser.exe

 pwsh  8  102ms
> .\a.exe
Enter the input string (end with '$'): a+a*a$
Success: The input string is accepted by the grammar.
 pwsh  8  22s 28ms
> .\a.exe
Enter the input string (end with '$'): a+*a$
Error: Unexpected character '*' at position 2
```