Ex No:9

Date:

IMPLEMENT CODE OPTIMIZATION TECHNIQUES CONSTANT FOLDING

AIM:

To write a C program to implement Constant Folding (Code optimization Technique).

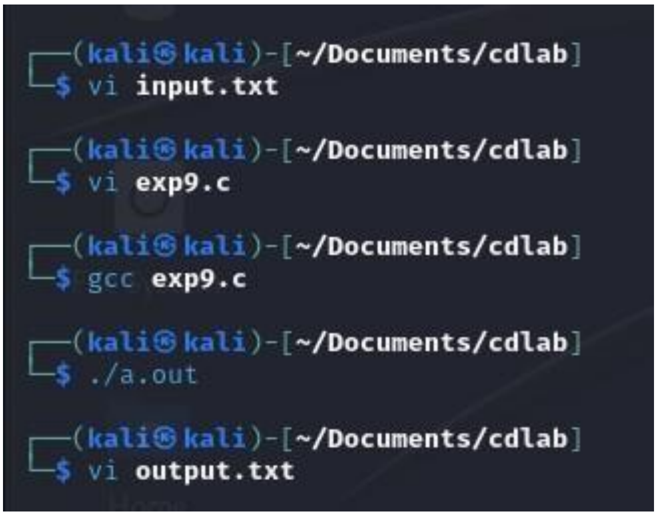
ALGORITHM:

- The desired header files are declared.
- The two file pointers are initialized one for reading the C program from the file and one for writing the converted program with constant folding.
- The file is read and checked if there are any digits or operands present.
- If there is, then the evaluations are to be computed in switch case and stored.
- Copy the stored data to another file.
- Print the copied data file.

PROGRAM:

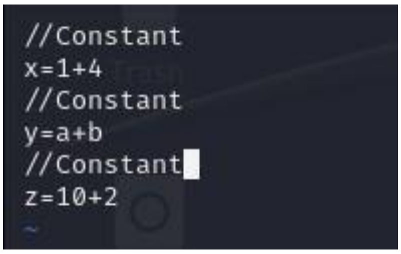
```
        #include <stdio.h>
#include <string.h>
#include <ctype.h>
void main() {
char s[20];
char flag[20] = "//Constant";
 char   result,   equal,   operator;
double op1, op2, interrslt;
int a, flag2 = 0;
 FILE *fp1, *fp2;
 fp1 = fopen("input.txt", "r");
 fp2  =  fopen("output.txt",  "w");
fscanf(fp1, "%s", s);
 while (!feof(fp1)) {
 if (strcmp(s, flag) == 0) { flag2 =
1;
      } if (flag2 == 1) { fscanf(fp1, "%s", s); result = s[0]; equal =
      s[1]; if (isdigit(s[2]) && isdigit(s[4])) { if (s[3] == '+' || s[3]
      == '-' || s[3] == '*' || s[3] == '/') { operator = s[3]; op1 =
      s[2] - '0'; op2 = s[4] - '0'; switch (operator) {
                  case '+': interrslt = op1
                  + op2; break; case '-':
                        interrslt = op1 - op2;
                        break;
                        case '*': interrslt = op1
                            * op2; break;
                        case '/':
                            if (op2 != 0)
                                interrslt = op1 / op2;
                            else {
                                fprintf(fp2, "Division by zero error.\n");
                                fclose(fp1); fclose(fp2); return;
                            }
                            break;
                        default: interrslt
                            = 0; break;
                    }
                    fprintf(fp2,     "/*Constant     Folding*/\n");
                    fprintf(fp2, "%c = %.2lf\n", result, interrslt);
                    flag2 = 0;
                }
            } else { fprintf(fp2, "Not
                Optimized\n"); fprintf(fp2,
                "%s\n", s);
            }
        } else { fprintf(fp2,
            "%s\n", s);
        }
        fscanf(fp1, "%s", s);
    }
    fclose(fp1);
    fclose(fp2);
}
```

OUTPUT:



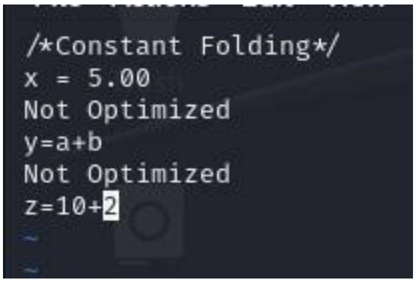
```
┌──(kali㉿kali)-[~/Documents/cdlab]
└─$ vi input.txt

┌──(kali㉿kali)-[~/Documents/cdlab]
└─$ vi exp9.c

┌──(kali㉿kali)-[~/Documents/cdlab]
└─$ gcc exp9.c

┌──(kali㉿kali)-[~/Documents/cdlab]
└─$ ./a.out

┌──(kali㉿kali)-[~/Documents/cdlab]
└─$ vi output.txt
```

Input.txt:



```
//Constant
x=1+4
//Constant
y=a+b
//Constant
z=10+2
~
```

Output.txt:



```
/*Constant Folding*/
x = 5.00
Not Optimized
y=a+b
Not Optimized
z=10+2
~
~
```

RESULT:

Thus, a C program to implement Constant Folding has been developed.