

## **Experiment – 10**

**Aim:** Implement a Machine Code for a given Intermediate Code.

**Program:**

**Exp-10.c:**

```
#include <stdio.h>

#include <stdlib.h>

#include <string.h>

int label[20];

int no = 0;

int check_label(int k) {
    int i;
    for (i = 0; i < no; i++) {
        if (k == label[i])
            return 1;
    }
    return 0;
}

int main() {
    FILE *fp1, *fp2;
    char fname[10], op[10], ch;
    char operand1[8], operand2[8], result[8];
    int i = 0, j = 0;
    printf("\n Enter filename of the intermediate code");
    scanf("%s", &fname);
    fp1 = fopen(fname, "r");
    fp2 = fopen("target.txt", "w");
```

```
if (fp1 == NULL || fp2 == NULL) {
    printf("\n Error opening the file");
    exit(0);
}
while (!feof(fp1)) {
    fprintf(fp2, "\n");
    fscanf(fp1, "%s", op);
    i++;
    if (check_label(i))
        fprintf(fp2, "\nlabel#%d", i);
    if (strcmp(op, "print") == 0) {
        fscanf(fp1, "%s", result);
        fprintf(fp2, "\n\t OUT %s", result);
    }
    if (strcmp(op, "goto") == 0) {
        fscanf(fp1, "%s %s", operand1, operand2);
        fprintf(fp2, "\n\t JMP %s,label#%s", operand1, operand2);
        label[no++] = atoi(operand2);
    }
    if (strcmp(op, "[]=") == 0) {
        fscanf(fp1, "%s %s %s", operand1, operand2, result);
        fprintf(fp2, "\n\t STORE %s[%s],%s", operand1, operand2, result);
    }
    if (strcmp(op, "uminus") == 0) {
        fscanf(fp1, "%s %s", operand1, result);
        fprintf(fp2, "\n\t LOAD -%s,R1", operand1);
        fprintf(fp2, "\n\t STORE R1,%s", result);
    }
    switch (op[0]) {
        case '*':
```

```
fscanf(fp1, "%s %s %s", operand1, operand2, result);  
fprintf(fp2, "\n \t LOAD%s,R0", operand1);  
fprintf(fp2, "\n \t LOAD%s,R1", operand2);  
fprintf(fp2, "\n \t MUL R1,R0");  
fprintf(fp2, "\n \t STORE R0,%s", result);  
break;  
case '+':  
fscanf(fp1, "%s %s %s", operand1, operand2, result);  
fprintf(fp2, "\n \t LOAD %s,R0", operand1);  
fprintf(fp2, "\n \t LOAD %s,R1", operand2);  
fprintf(fp2, "\n \t ADD R1,R0");  
fprintf(fp2, "\n \t STORE R0,%s", result);  
break;  
case '-':  
fscanf(fp1, "%s %s %s", operand1, operand2, result);  
fprintf(fp2, "\n \t LOAD %s,R0", operand1);  
fprintf(fp2, "\n \t LOAD %s,R1", operand2);  
fprintf(fp2, "\n \t SUB R1,R0");  
fprintf(fp2, "\n \t STORE R0,%s", result);  
break;  
case '/':  
fscanf(fp1, "%s %s %s", operand1, operand2, result);  
fprintf(fp2, "\n \t LOAD %s,R0", operand1);  
fprintf(fp2, "\n \t LOAD %s,R1", operand2);  
fprintf(fp2, "\n \t DIV R1,R0");  
fprintf(fp2, "\n \t STORE R0,%s", result);  
break;  
case '%':  
fscanf(fp1, "%s %s %s", operand1, operand2, result);  
fprintf(fp2, "\n \t LOAD %s,R0", operand1);
```

```
fprintf(fp2, "\n \t LOAD %s,R1", operand2);
fprintf(fp2, "\n \t DIV R1,R0");
fprintf(fp2, "\n \t STORE R0,%s", result);
break;
case '=':
fscanf(fp1, "%s %s", operand1, result);
fprintf(fp2, "\n\t STORE %s %s", operand1, result);
break;
case '>':
j++;
fscanf(fp1, "%s %s %s", operand1, operand2, result);
fprintf(fp2, "\n \t LOAD %s,R0", operand1);
fprintf(fp2, "\n\t JGT %s,label#%s", operand2, result);
label[no++] = atoi(result);
break;
case '<':
fscanf(fp1, "%s %s %s", operand1, operand2, result);
fprintf(fp2, "\n \t LOAD %s,R0", operand1);
fprintf(fp2, "\n\t JLT %s,label#%d", operand2, result);
label[no++] = atoi(result);
break;
}
}
fclose(fp2);
fclose(fp1);
fp2 = fopen("target.txt", "r");
if (fp2 == NULL) {
printf("Error opening the file\n");
exit(0);
}
```

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```
do {  
    ch = fgetc(fp2);  
    printf("%c", ch);  
} while (ch != EOF);  
fclose(fp1);  
return 0;  
}
```

**input.txt:**

=t1 2

[]=a 0 1

[]=a 1 2

[]=a 2 3

\*t1 6 t2

+a[2] t2 t3

-a[2] t1 t2

/t3 t2 t2

uminus t2 t2

print t2

goto t2 t3

=t3 99

uminus 25 t2

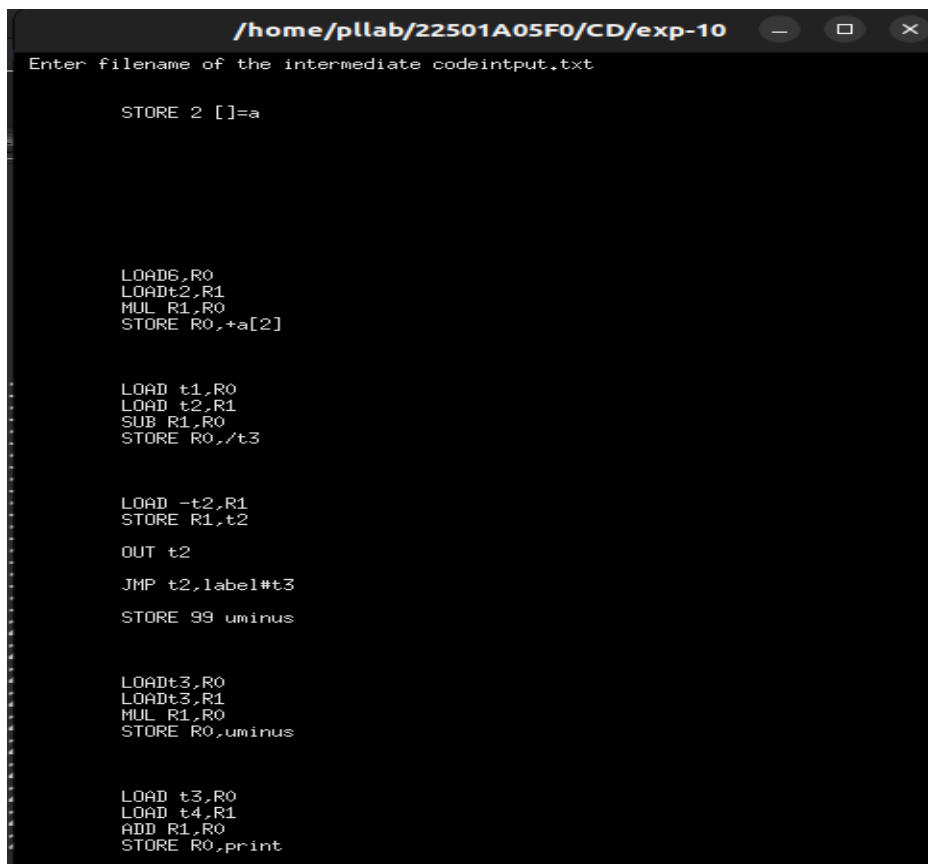
\*t2 t3 t3

uminus t1 t1

+t1 t3 t4

print t4

### Output:



```
/home/pllab/22501A05F0/CD/exp-10
Enter filename of the intermediate codeinput.txt

STORE 2 []=a

LOAD6,R0
LOADt2,R1
MUL R1,R0
STORE R0,+a[2]

LOAD t1,R0
LOAD t2,R1
SUB R1,R0
STORE R0,/t3

LOAD -t2,R1
STORE R1,t2

OUT t2

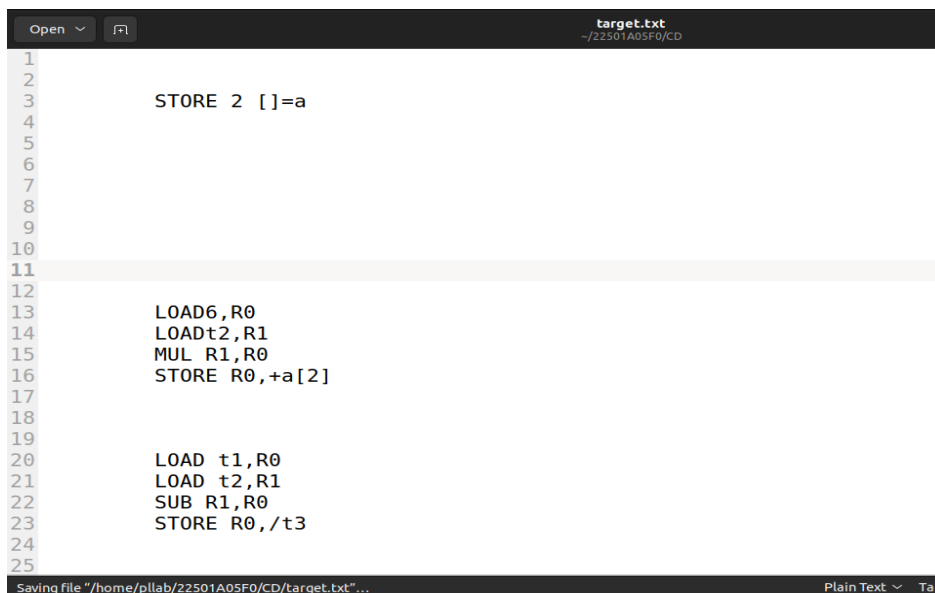
JMP t2,label#t3

STORE 99 uminus

LOADt3,R0
LOADt3,R1
MUL R1,R0
STORE R0,uminus

LOAD t3,R0
LOAD t4,R1
ADD R1,R0
STORE R0,print
```

target.txt:



```
target.txt
~/22501A05F0/CD

1
2
3     STORE 2 []=a
4
5
6
7
8
9
10
11
12
13     LOAD6,R0
14     LOADt2,R1
15     MUL R1,R0
16     STORE R0,+a[2]
17
18
19
20     LOAD t1,R0
21     LOAD t2,R1
22     SUB R1,R0
23     STORE R0,/t3
24
25

Saving file "/home/pllab/22501A05F0/CD/target.txt"... Plain Text Tab
```

**Conclusion:** Machine code for given intermediate code has been implemented successfully.