Shri Ramdeobaba College of Engineering and Management, Nagpur
Department of Computer Science and Engineering
Session: 2022-2023

Compiler Design Lab

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PRACTICAL No. 5

Topic: Three Address Code Generation

Platform: Windows or Linux

Language to be used: Python or Java (based on the companies targeted for placement)

CO Mapped: CO4- Learn three address code generation and implement code optimization techniques for improving the performance of a program segment.

Aim: Write a program to generate three address code for the given language construct using SDTS.

- **(a)** Batch E1 : if-then-else,
- **(b)** Batch E2: for loop
- **(c)** Batch E3: while loop
- **(d)** Batch E4: do while loop

Input: Example for if-then-else

```
if (a<5)
{
        c= b+d
        d= i+j
}
else
{
         d= a+ b
        k= x+y

}
```

Output:

1) if (a<5) goto 3
2) Goto_8
3) T1=b+d
4) c=T1
5) T2=i+j
6) d=T2
7) goto__12_
8) T3=a+b
9) d=T3
10) T4=x+y
11) k=T4
12) END

In [5]:

```
from prettytable import PrettyTable

def while_loop(cleaned_code):
    final_code = []
    while_idx = None
    for i in range(len(cleaned_code)):
        codeline = cleaned_code[i]

        if 'while' in codeline:
            while_idx = i
            start_idx = codeline.index('(')
            end_idx = codeline.index(')')
            bool_condn = ''.join(codeline[start_idx:end_idx+1])
            final_code.append('if !{} goto({})'.format(bool_condn,None))
            while_idx = i
        elif 'do' in codeline:
            start_idx = codeline.index('')
            end_idx = codeline.index('')

        elif '}' in codeline:
            final_code.append('goto({})'.format(while_idx+1))
            final_code[while_idx] = final_code[while_idx].replace('None',str(i+2))
            while_idx = None
        else:
            final_code.append(codeline)
    return final_code
```

In [9]:

```
with open('code.txt') as f:
    code = f.readlines()

# print('The Statement is:')
# print(''.join(code))

cleaned_code = []
for i in range(len(code)):
    if code[i] != '\n':
        if code[i][-1] == '\n':
            cleaned_code.append(code[i][:-1].strip())
        else:
            cleaned_code.append(code[i].strip())

final_code = while_loop(cleaned_code)

final_code.append('END')
```

In [10]:

```
print('\nThe Three Code Generated is:')
x1 = PrettyTable()
x1.field_names = ['Index','Code']
for i in range(len(final_code)):
    x1.add_row([i+1,final_code[i]])

print(x1)
```

```
The Three Code Generated is:
+-------+------------------------+
| Index |          Code          |
+-------+------------------------+
|   1   |         c = 0          |
|   2   |         a = 1          |
|   3   |         b = 2          |
|   4   |         c = 1          |
|   5   | if !(a < b) goto(None) |
|   6   |         c = 0          |
|   7   |          END           |
+-------+------------------------+
```

In [ ]:

```

```