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.

Batch E3: 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

Code:-

```python
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
            # The loop condition would be enclosed in brackets
            start_idx = codeline.index('(')
            end_idx = codeline.index(')')
            # Select the substring between start_idx and end_idx
            bool_condn = ''.join(codeline[start_idx:end_idx+1])
            final_code.append('if !{} goto({})'.format(bool_condn,None))
            while_idx = i
        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


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':
            # don't include the \n at the end of each line
            cleaned_code.append(code[i][:-1].strip())
        else:
            cleaned_code.append(code[i].strip())

final_code = while_loop(cleaned_code)

final_code.append('END')
```

```
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)
```

Output:-

```
PS C:\Users\asus\OneDrive\Desktop\college_sem\5th sem\cd_lab> cd prac5
PS C:\Users\asus\OneDrive\Desktop\college_sem\5th sem\cd_lab\prac5> python -u "c:\Users\asus\OneDr
ege_sem\5th sem\cd_lab\prac5\prog5.py"
The Statement is:
c = 0
a = 1
b = 2
| Index |        Code         |
+-------+---------------------+
|   1   |        c = 0        |
|   2   |        a = 1        |
|   3   |        b = 2        |
|   4   |  if !(a < b) goto(7)|
|   5   |        c = 1        |
|   6   |       goto(4)       |
|   7   |        c = 0        |
|   8   |         END         |
+-------+---------------------+
PS C:\Users\asus\OneDrive\Desktop\college_sem\5th sem\cd_lab\prac5> []
```

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