**BRAC UNIVERSITY**

**Department of Computer Science and Engineering**

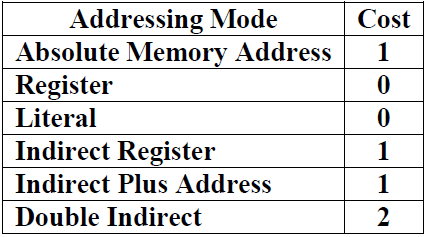
**CSE420: Compiler Design**

**Quiz 03, Summer 2016**

**Duration: 40 minutes, Total Marks: 20**

|  |
| --- |
| Student Name:  Student ID:  Section: |

1. Show the responsibilities of caller and callee in the creation of an activation record. [3.5]
2. Draw the block diagram of basic storage allocation. [2.5]
3. Consider a hypothetical machine with two registers R1, [R2] and six addressing modes with the following costs.



Calculate the total cost of following code segment. [4]

*a=b+c*

*param b*

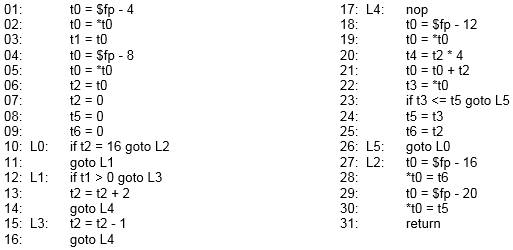
*param a*

*param d*

*call s, 3*

|  |  |
| --- | --- |
| **Machine Code** | **Cost** |
| move b, R1 | 1+1+0+0=2 |
| move c, [R2] | 1+1+1+1=4 |
| add R1, [R2] | 1+1+1+1=4 |
| param [R2] | 1+1=2 |
| param R1 | 1+0=1 |
| param d | 1+1=2 |
| call s,3 | 1+1+0=2 |
| Total Cost | 17 |

1. Consider the following code segment: [5+5+2]



1. Draw the control flow graph by defining each individual basic block.
2. Provide Use set and Define set of each basic block.
3. Calculate the Live set for each consecutive block.

10

9

8

7

6

5

4

3

2

1

|  |  |  |
| --- | --- | --- |
| Block no | Use set | Define set |
| 1 | fp, | t0,t1,t2,t5,t6 |
| 2 | t2 |  |
| 3 |  |  |
| 4 | t1 |  |
| 5 | t2 | t2 |
| 6 | t2 | t2 |
| 7 | fp,t2 | t0,t4,t3 |
| 8 | t2 | t6 |
| 9 |  |  |
| 10 | fp,t6,t5 | t0 |

|  |  |
| --- | --- |
| Consecutive Block | Live set |
| 1-2 | t2 |
| 2-3 |  |
| 2-10 |  |
| 3-4 |  |
| 4-5 |  |
| 4-6 |  |
| 5-7 | t2 |
| 6-7 | t2 |
| 7-8 | t2 |
| 7-9 |  |
| 8-9 |  |