# Solutions to Mid-Term Exam #2

**Part I: Multiple choices (12 pts with 3 points each)**

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| C | B | D | A |

**Part II: AVL trees (5 points)**

No. we need to perform right-left-rotation!

```
       60
      /  \
    20    70
   /  \     \
  10  30    80  (after right rotation)
     /  \
   25   40
          \
          50


       60
      /  \
    30    70
   /  \     \      (after left rotation)
  20  40    80
 /  \   \
10  25  50
```
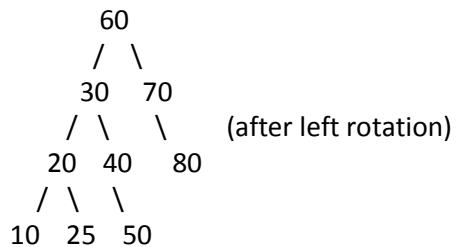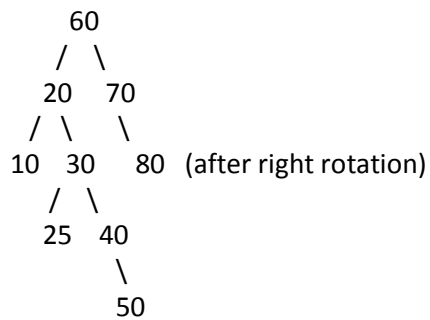
**Part III: Short answers (6 points)**

(1) Inorder traversal:
   10, 100, 50, 70, 40, 60, 20, 80
(2) Postorder traversal:
   10, 50, 40, 70, 100, 80, 20, 60

**Part IV: Hashing (9 points)**

**(1)**

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|----|
| RATE | BETA | ALPHA | MEAN | WAGE | SUM | NUM | KAPPA | PAY | BAR | FREQ |

**(2)**
**Open addressing including linear probing, quadratic probing and double hashing; Chaining**

## Part V: Programming (10 pts)

See solutions discussed in class and your HW.