4.16

```
          4
        /   \
       2     6
      / \   / \
     1   3 5   9
              /
             7
```
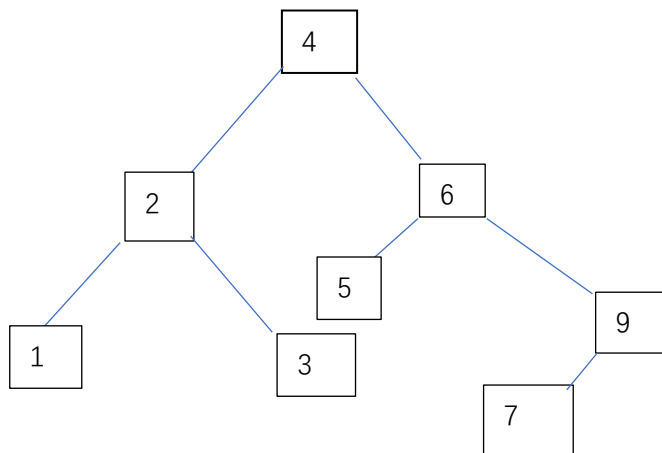
4.22
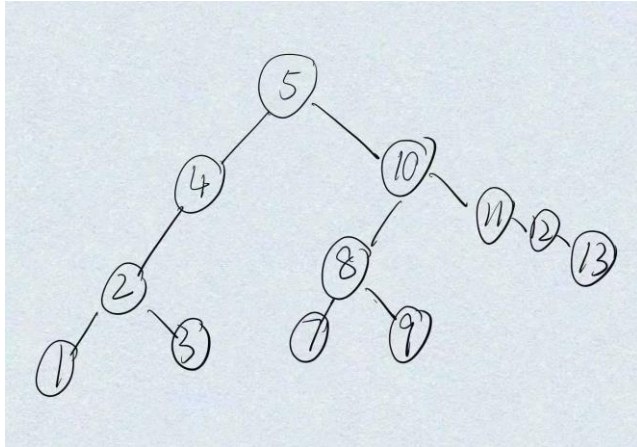
```
static Position doubleRotateWithLeft(Position k3)
{
    Position k1 = k3->left;
    Position k2 = k1->right;
    k1->right = k2->left;
    k3->left = k2->right;
    k2->left = k1;
    k2->right = k3;
    k1->height = Max(height(k1->left), height(k1->right)) + 1;
    k3->height = Max(height(k3->left), height(k3->right)) + 1;
    k2->height = Max(height(k2->left), height(k2->right)) + 1;
    return k2;
}

static Position doubleRotateWithRight(Position k1)
{
    Position k3 = k1->right;
    Position k2 = k3->left;
    k1->right = k2->left;
    k3->left = k2->right;
    k2->left = k1;
    k2->right = k3;
    k1->height = Max(height(k1->left), height(k1->right)) + 1;
    k3->height = Max(height(k3->left), height(k3->right)) + 1;
    k2->height = Max(height(k2->left), height(k2->right)) + 1;
    return k2;
}
```
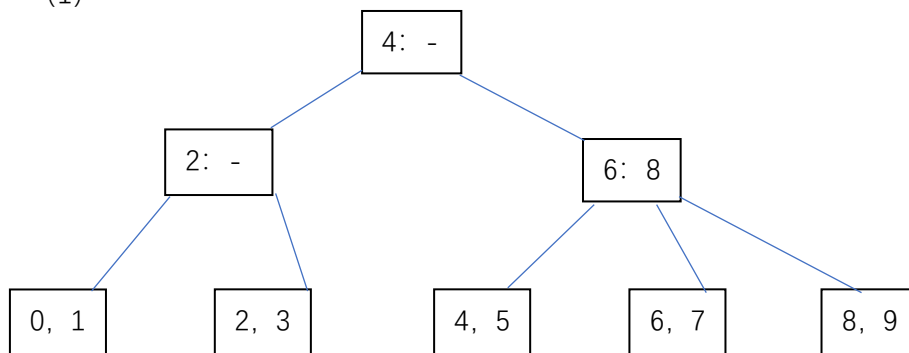
4.24

4.36

(1)

```
                        ┌─────────┐
                        │  4:  -  │
                        └─────────┘
                   ┌────────┘    └────────┐
              ┌─────────┐            ┌─────────┐
              │  2:  -  │            │  6:  8  │
              └─────────┘            └─────────┘
            ┌──────┘  └──────┐    ┌────┘  │    └────┐
        ┌────────┐  ┌────────┐ ┌────────┐┌────────┐┌────────┐
        │  0, 1  │  │  2, 3  │ │  4, 5  ││  6, 7  ││  8, 9  │
        └────────┘  └────────┘ └────────┘└────────┘└────────┘
```

(2)

```
                        ┌─────────┐
                        │  5:  -  │
                        └─────────┘
                   ┌────────┘    └────────┐
              ┌─────────┐            ┌─────────┐
              │  3:  -  │            │  7:  -  │
              └─────────┘            └─────────┘
            ┌──────┘  └──────┐    ┌────┘    └────┐
        ┌────────┐  ┌────────┐ ┌────────┐   ┌────────┐
        │  1, 2  │  │  3, 4  │ │  5, 6  │   │  7, 8  │
        └────────┘  └────────┘ └────────┘   └────────┘
```