Quiz1
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1.

1. The capacity of a track = 512 × 50 = 25600 (bytes)

   The capacity of each surface = 2000 × 512 × 50 = 51200000 (bytes)

   The capacity of the disk = 2000 × 512 × 50 × 5 × 2 = 512000000 (bytes)

2. At most ~~20~~ 10 records in one block.

3. 100000 ÷ 10 = 10000 blocks are required to store the entire file.

4. 25600 ÷ 1024 = 25 blocks in a track.

   There are 25 × 2 × 5 = 250 blocks in a cylindar

   so. 10000 ÷ 250 = 40 cylindars, we need 10 surfaces to arrang the file.

5. Each cylinder has 250 blocks, the disk has 2000 cylinders. And a block contains 10 records
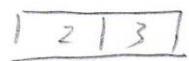
   As a result, the disk can store 5 million records.

6. The page 26 is on block 1 of track 1 on the next disk surface.
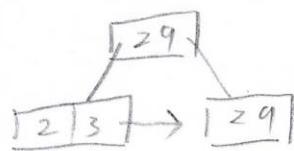
2.

a. three
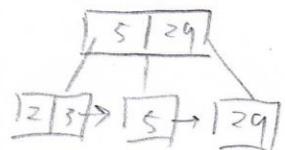
1) 2, 3
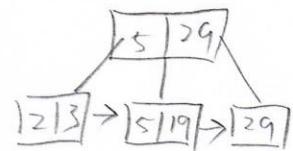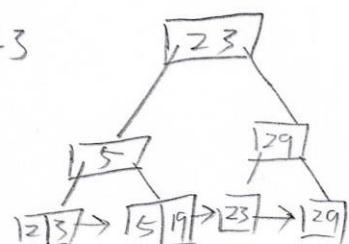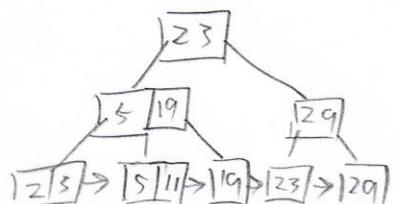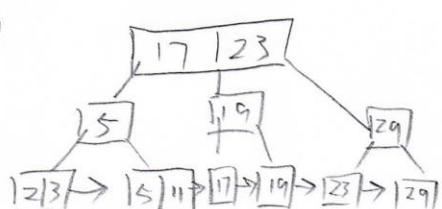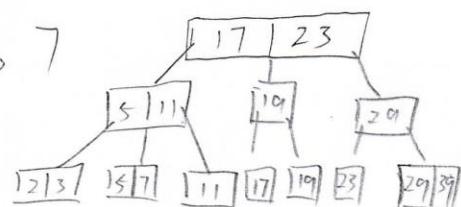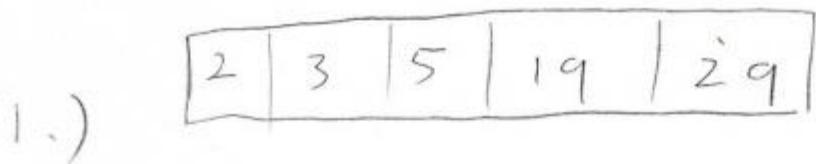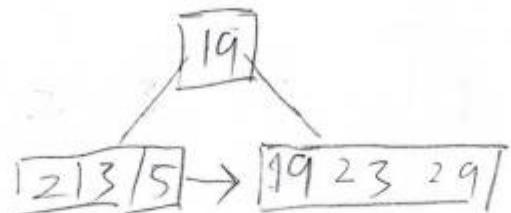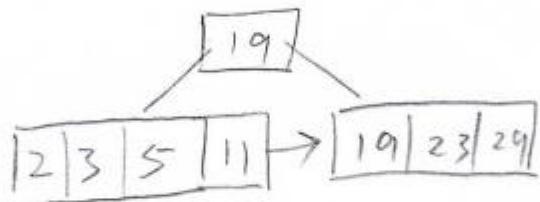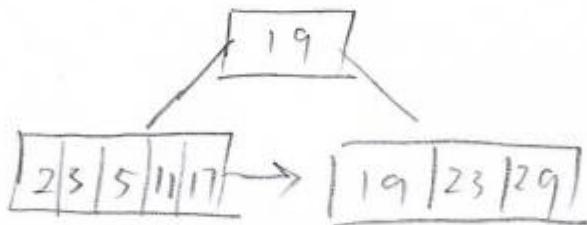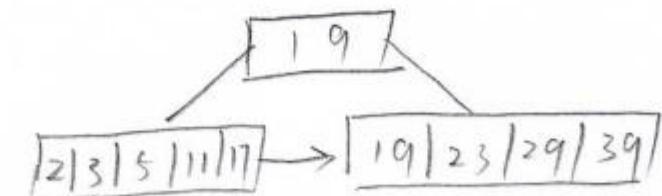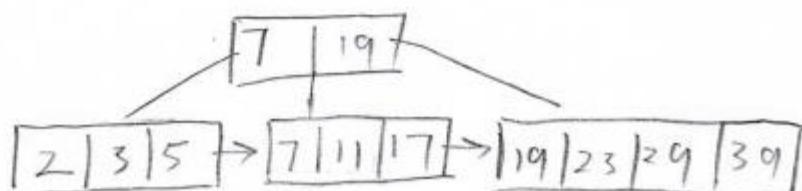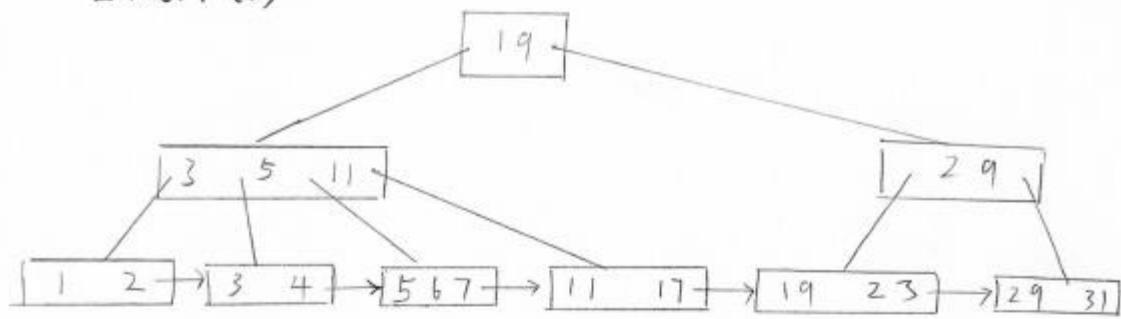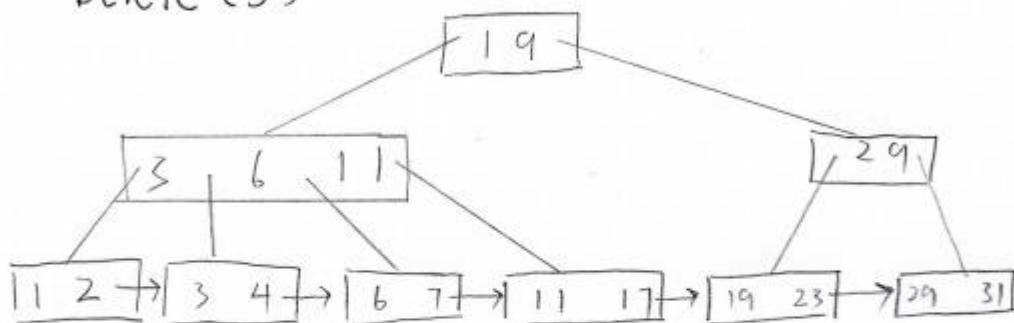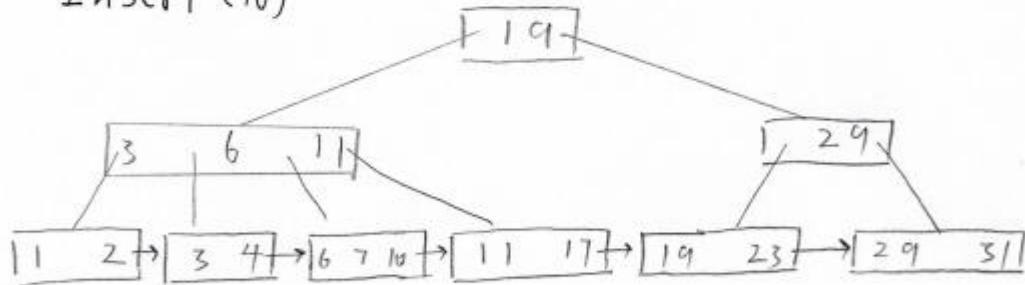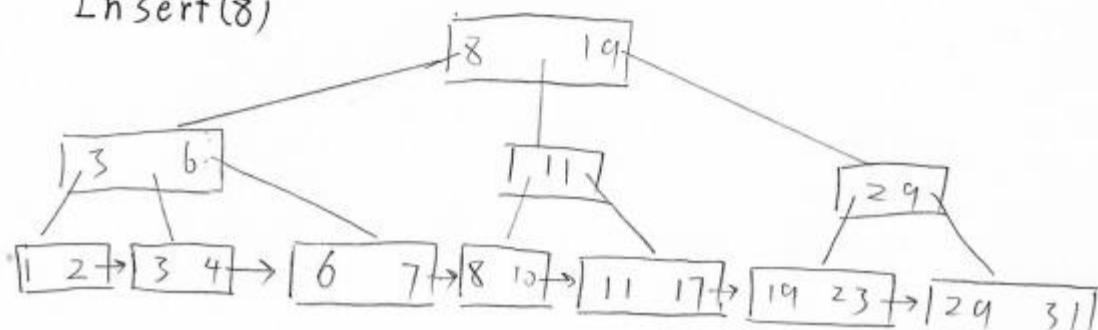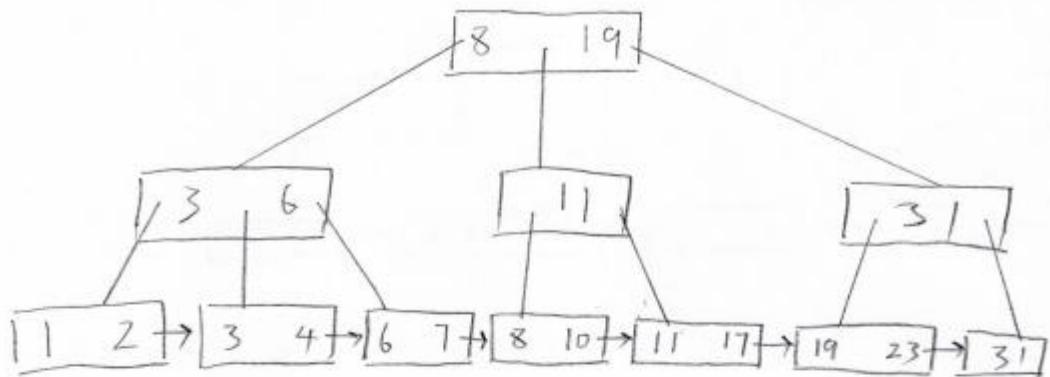
`| 1 | 2 | 3 |`

2) 29

```
        | 29 |
       /      \
  |2|3|  →  |1|29|
```

3) 5

```
      | 5 | 29 |
     /    |     \
  |2|3| → |5| → |29|
```

4) 19

```
       | 5 | 29 |
      /    |     \
  |2|3| → |5|19| → |29|
```

5) 23

```
           | 23 |
          /      \
       | 5 |     | 29 |
      /    \     /     \
  |2|3| → |5|19| → |23| → |29|
```

6) 11

```
              | 23 |
             /      \
      | 5 | 19 |    | 29 |
     /    |    \    /     \
  |2|3| → |5|11| → |19| → |23| → |29|
```

7) 17

```
            | 17 | 23 |
           /     |     \
       | 5 |   | 19 |   | 29 |
      /    \   /    \   /     \
  |2|3| → |5|11| → |17| → |19| → |23| → |29|
```

8) 39, 7

```
               | 17 | 23 |
              /     |      \
       | 5 | 11 |  | 19 |  | 29 |
      /    |    \   /  \    /    \
  |2|3| |5|7| |11| |17| |19| |23| |29|39|
```

b. Six

1.)

2	3	5	19	29

2.) 23.

```
        [19]
       /    \
  |2|3|5| → |19 23 29|
```

3.) 11

```
         [19]
        /    \
  |2|3|5|11| → |19|23|29|
```

4.) 17

```
           [19]
          /    \
  |2|3|5|11|17| → |19|23|29|
```

5.) 39

```
            [19]
           /    \
  |2|3|5|11|17| → |19|23|29|39|
```

6.) 7

```
        [7 | 19]
       /   |    \
  |2|3|5| → |7|11|17| → |19|23|29|39|
```

Insert (3)

```
                              19

        3    5    11                        2 9

  1  2 →  3  4 → 5 6 7 → 11   17 → 19   23 → 29   31
```

Delete (5)

```
                              19

        3    6    11                        2 9

  1 2 → 3  4 → 6  7 → 11   17 → 19  23 → 29   31
```

Insert (10)

```
                              19

        3    6    11                        2 9

  1   2 → 3  4 → 6 7 10 → 11   17 → 19   23 → 29   31
```

Insert (8)

```
                         8        19

        3    6                11                    2 9

  1 2 → 3  4 → 6   7 → 8  10 → 11  17 → 19  23 → 29   31
```

Delete (29)


```
                          8        19
                 ┌─────────┼────────────────┐
              3      6          11              3 1
          ┌───┼───┐      ┌────┼────┐      ┌────┴────┐
       1  2 → 3  4 → 6  7 → 8  10 → 11  17 → 19  23 → 31
```

Delete (19)


```
                          8        23
                 ┌─────────┼────────────────┐
              3      6          11              3 1
          ┌───┼───┐      ┌────┼────┐      ┌────┴────┐
       1  2 → 3  4 → 6  7 → 8  10 → 11 17 → 23 → 31
```

Delete (11)


```
                          8        2 3
                 ┌─────────┼────────────────┐
              3  6          17              3 1
          ┌───┼───┐      ┌────┼────┐      ┌────┴────┐
       1  2 → 3  4 → 6  7 → 8  10 → 17 → 23 → 31
```
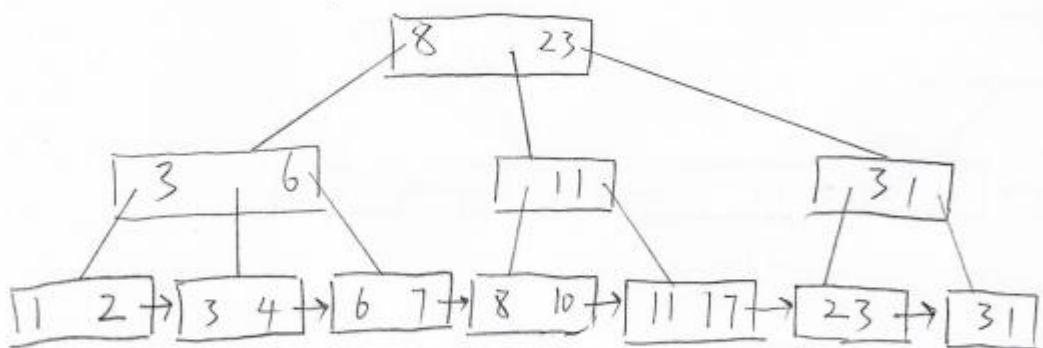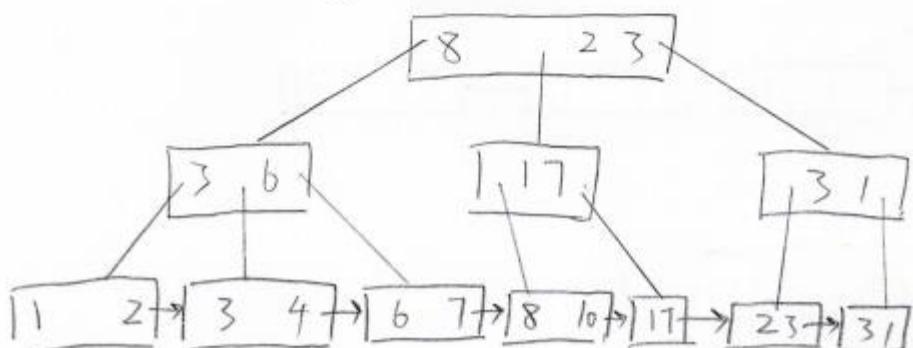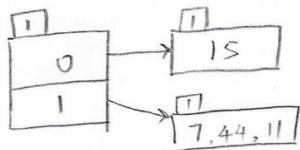
$7 \bmod 7 = 0 = 00000$

$19 \bmod 7 = 5 = 00101$

$15 \bmod 7 = 1 = 00001$

$3 \bmod 7 = 3 = 00011$

$44 \bmod 7 = 2 = 00010$

$33 \bmod 7 = 5 = 00101$

$11 \bmod 7 = 4 = 00100$

$17 \bmod 7 = 3 = 00011$
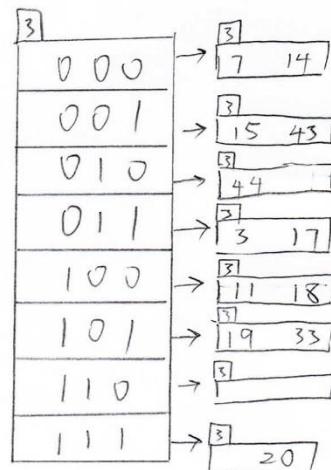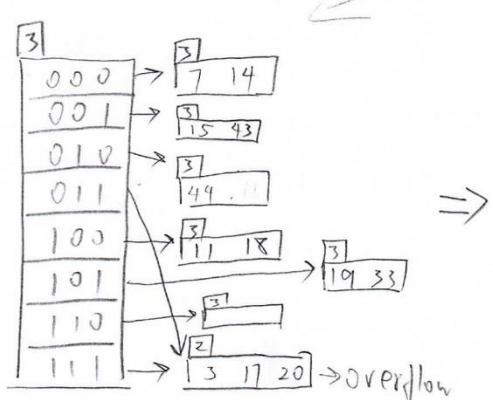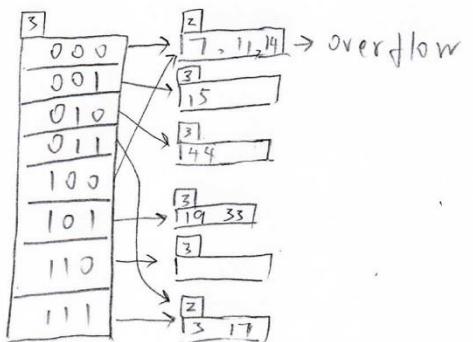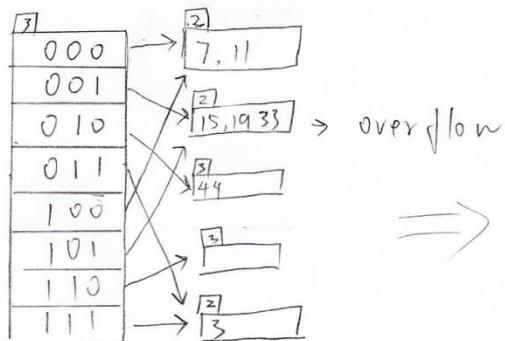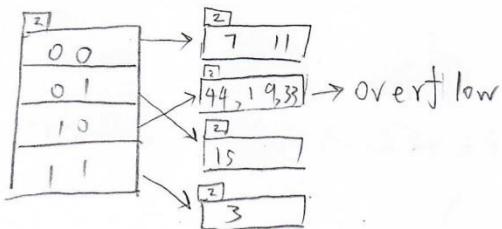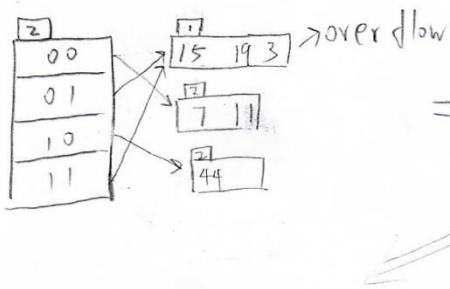
$14 \bmod 7 = 0 = 00000$

$43 \bmod 7 = 1 = 00001$

$18 \bmod 7 = 4 = 00100$

$20 \bmod 7 = 6 = 00111$

11 is overflow (split Bucket 1)

Stage 1:

1	
0	→ [1] 15
1	→ [1] 7, 44, 11

Stage 2:

2	
00	→ [1] 15 19 3 → overflow
01	→ [1] 7 11
10	
11	→ [2] 44

⇒

2	
00	→ [2] 7 11
01	→ [2] 44, 19 33 → overflow
10	→ [2] 15
11	→ [2] 3

Stage 3:

3	
000	→ [2] 7, 11
001	→ [2] 15, 19 33 → overflow
010	→ [3] 44
011	
100	
101	→ [3]
110	
111	→ [2] 3

⇒

3	
000	→ [2] 7, 11, 14 → overflow
001	→ [3] 15
010	→ [3] 44
011	
100	
101	→ [3] 19 33
110	→ [3]
111	→ [2] 3 17

Stage 4:

3	
000	→ [3] 7 14
001	→ [3] 15 43
010	→ [3] 44 .
011	→ [3] 11 18 → [3] 19 33
100	
101	→ [3]
110	→ [2] 3 17 20 → overflow
111	

⇒

3	
000	→ [3] 7 14
001	→ [3] 15 43
010	→ [3] 44
011	→ [2] 3 17
100	→ [3] 11 18
101	→ [3] 19 33
110	→ [3]
111	→ [3] 20

END