ECS150 Assignment 3 Hint

May 2022

Q6

- **Update the file directory** is not an I/O operation.
- **Read** is an I/O operation.
- **Write** is an I/O operation.

a.

contiguous

Only the position of the file directory needs to be updated, which means the begin of the data block is from block 1 to block 2.

zero operation

linked

The OS must read the first linked block to retrieve the second linked block's position, and then update the begin of the data blocks.

1 *read operation*

indexed

The OS must read the index table, then written out the data that index table pointing to, and updating the table.

1 *read* + 1 *written out*

b.

contiguous

For each contiguous block, the block must be read and written into (shifted) other places, then written the new data into the new block.

$$50 * (1\ read + 1\ shifted) + 1\ written\ new\ data = 101$$

However, in the worst case, we do not have sufficient space to store data. As a result, we need to delete the entire blocks and rebuild them in new location.

$$100 * (1\ read + 1\ shifted) + 1\ written\ new\ data = 201$$

linked

We need to read from the first linked block to find the middle one, add a new block, then adjust the pointer for the original 50th linked block.

$$50\ read + 1\ create\ new\ block + 1\ write\ the\ new\ pointer$$

indexed

We need to read the index table, write new block's location in the index table, and write the new data into the new block.

$$1\ read + 1\ write\ in\ table + 1\ write\ new\ data$$

c.

The idea is the same as part b. For contiguous one, we must consider the worst case as one of the situation.