1. SQL

1.
```
SELECT E.eid, E.ename, E.salary
FROM Employees E
WHERE E.eid NOT IN (
    SELECT C.eid
    FROM Certified C
)
ORDER BY E.salary DESC;
```

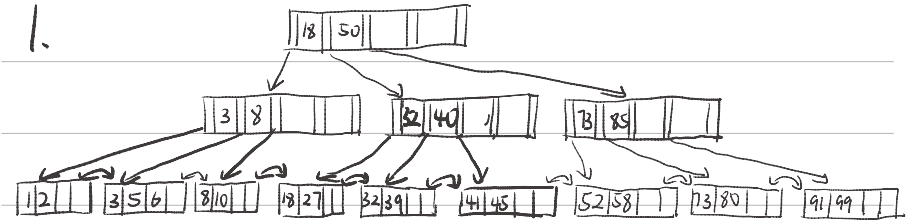
2.
```
SELECT E.eid, E.ename, E.salary
FROM Employees E
INNER JOIN Certified C
ON E.eid = C.eid
AND E.salary > (
    SELECT AVG(E.salary)
    FROM Employees E
    INNER JOIN Certified C
```

```
    ON E.eid=C.eid
)
ORDER BY E.salary;
```

3. BC

2. Index and B+ Trees

1.



2. $(2d) \times (2d+1)^h = 3000 \times 3001^2$

$\approx 2.7 \times 10^{10}$ records

3. File Organization

1.1. B

We can do an index-only scan, and less IOs than the clustered one

E

For not index-only plans, index can do nothing but just increasing IOs

2. C

With clustered B+ tree index, we can retrieve the first record with floor = 10, and then all the other record with floor = 10 in order of budget.

C

2.1. $4 \times 4 + 1 = 17$ bytes

2. $\frac{128 \times 1024 \times 8 - 32 \times 8}{17 \times 8 + 1} \approx 7651$ records