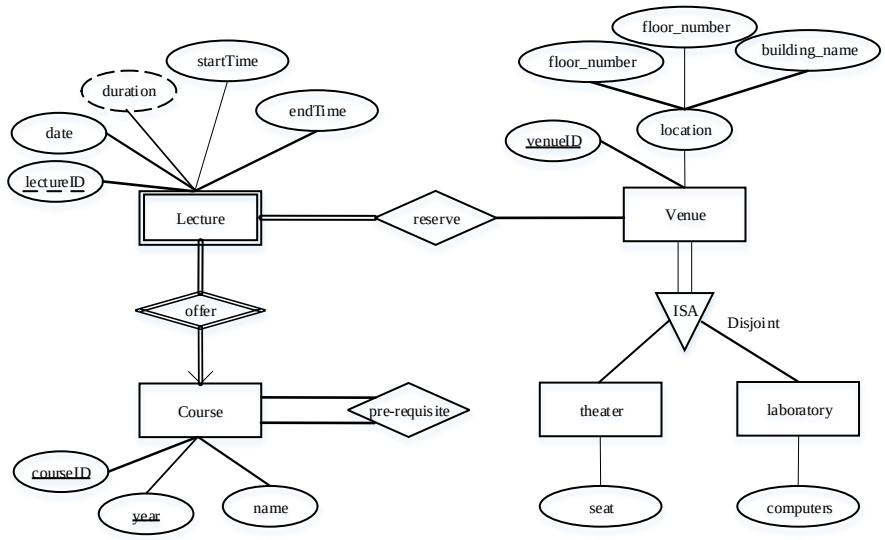
Section 1:

1. B 2. B 3.C

Section 2:

Question 1:



Course(<u>courseID</u>, <u>year</u>, name)
Foreign key: none

Lecture(<u>lectureID</u>, <u>courseID</u>, <u>year</u>, date, startTime, endTime, duration)
Foreign key: {courseID, year} referecing Courses

Venue(<u>venueID</u>, location.floor_number, location.floor_num, location.building_name)

theater(venueID, seat)
Foreign key: {venueID} referencing Venue

laboratory(venueID, computers)
Foreign key: {venueID} referencing Venue

reserve(<u>lectureID</u>, <u>courseID</u>, <u>year</u>, <u>venueID</u>)
Foreign key: {lectureID, courseID, year} referecing Lectures,
{venueID} referencing Venue

pre-requisite(courseID, year, preCourseID, preYear)
Foreign key: {preCourseID, preYear} referencing Course

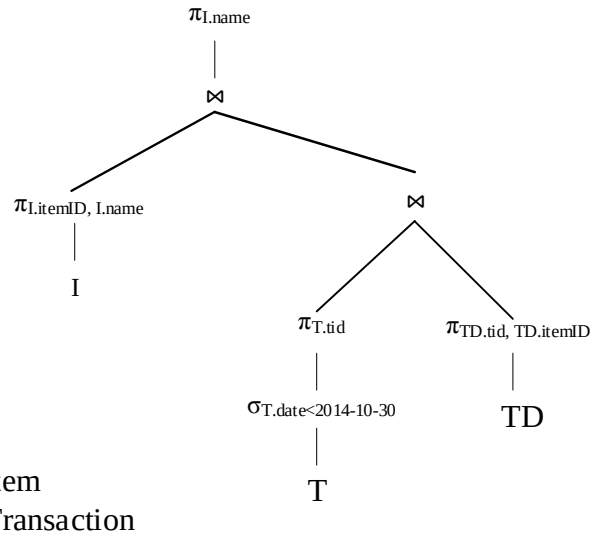
Question 2a:

```
SELECT name , sum(quantity)
FROM Item I LEFT OUTER JOIN TransactionDetail g
ON I.itemID = g.itemID
GROUP BY g.itemID
```

Question 2b:

```
SELECT DISTINCT name
FROM Item I, Transaction T, TransactionDetail D
WHERE  I.itemID = D.itemID AND
          D.tid = T.tid AND
          T.date <  " 2014-10-30"
```

$\pi_{I.name}($
$\sigma_{\text{T.date < " 2014-10-30"}} (\rho I(\text{Item}) \bowtie \rho_T(\text{Transaction}) \bowtie \rho_D(\text{TransactionDetail}))$
)



I: Item
T:Transaction
TD: TransactionDetail