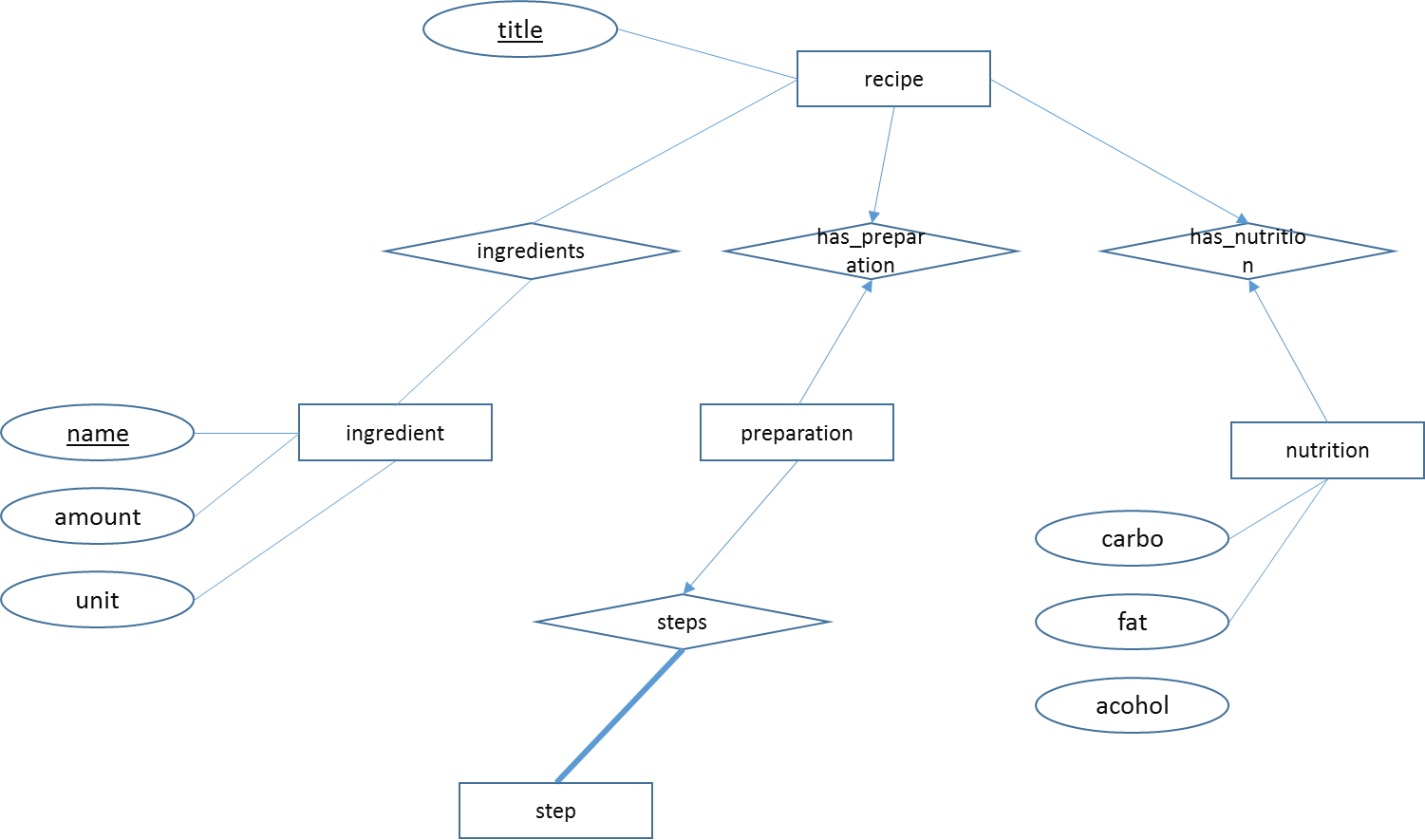
# Question 1

* A(a1, a2)
* B(a1) , a1 refer to A
* C(a1, c1) , a1 refer to A
* D(d1,d2)
* E(e1, e2, bd1), bd1 refer to BD
* F(f1,f2, a1) , a1 refer to C
* BD(bd1, a1, d1)

2)



# Question 2

NOT ON FINAL

# Question 3

1)

|  |
| --- |
| **a)**  **SELECT** **c**.pids **FROM** `**Current**` **c** **JOIN** Past p **ON** (**c**.tid = p.tid, **c**.pid = p.pid);  **b)**  **SELECT** \* **FROM**  (  **SELECT** tid, pid, `**from**`, `**to**` **FROM** past  **UNION**  **SELECT** tid, pid, `**from**`, **current\_time as `to`** **FROM** **current**  ) **as** union\_select  **ORDER** **BY** (tid,`**from**`);  **c)**  **SELECT** **DISTINCT** p. pid, p.pname **FROM** `**Current**` **c**  **JOIN** Task t **ON** **c**.tid = t.tid  **JOIN** Person p **ON** **p**.pid = c.pid  **WHERE** t.difficulty >= 4;  **d)**  **SELECT** tids **FROM** Task t **WHERE** (  **SELECT** **count**(\*) **FROM** Past p **WHERE** p.tid = t.tid  ) > 10;  **e)**  **SELECT** tids **FROM** Task t **WHERE** (  **SELECT** **count**(\*) **FROM** Past p **WHERE** p.tid = t.tid  ) + (  **SELECT** **count**(\*) **FROM** **Current** **c** **WHERE** **c**.tid = t.tid  ) > 10;  **f)**  **CREATE** **TRIGGER** pointless  **BEFORE** **INSERT** **ON** `**Current**`  **REFERENCING** **NEW** **as** nrow  **FOR** **EACH** **ROW**  **INSERT** **INTO** Past **VALUES** (  **SELECT** \*, **current\_time** **FROM** `**Current**` **c** **WHERE** **c**.tid = nrow.tid  )  **DELETE** **FROM** `**Current**` **c** **WHERE** **c**.tid = nrow.tid; |

2.a

for $a in /recipe

for $b in $a/preparation

where $b[count(step) >= 2

return $a

b) /recipes[[@title=’ Gingerbread Cookie’]/nutrition/@fat = /nutrition/@fat]

let $a = /recipes[@title=’ Gingerbread Cookie’]/nutrition/@fat

for $b in /recipe

where $a= $b/nutrition/@fat

return $b

# Question 4

1. YES
2. NO
3. NO
4. T1 -> T3, T1 -> T2, T2-> T3, T2-> T1, T3-> T1

Cycle not serializable

1. Yes L7-L8
2. Yes L3-L5
3. Yes L6-L8-L11
4. No

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| T1 | T2 | T3 |  | A | B | R |
| S(a) |  |  |  | S1 |  |  |
| R(a) |  |  |  | S1 |  |  |
| S(b) |  |  |  | S1 | S1 |  |
| R(b) |  |  |  | S1 | S1 |  |
| X(b) |  |  |  | S1 | X1 |  |
| W(b) |  |  |  | S1 | X1 |  |
|  | S(a) |  |  | S1, S2 | X1 |  |
|  | R(a) |  |  | S1, S2 | X1 |  |
|  | S(b) |  |  | S1, S2 | X1 | S2(b) |
|  | blocked |  |  | S1, S2 | X1 | S2(b) |
|  |  | S(a) |  | S1, S2, S3 | X1 | S2(b) |
|  |  | R(a) |  | S1, S2, S3 | X1 | S2(b) |
|  |  | X(a) |  | S1, S2, S3 | X1 | S2(b), X3(a) |
|  |  | blocked |  | S1, S2, S3 | X1 | S2(b), X3(a) |
| X(a) |  |  |  | S1, S2, S3 | X1 | S2(b), X3(a) |
| blocked |  |  |  | S1, S2, S3 | X1 | S2(b), X3(a) |
| abort |  |  |  | S1, S2, S3 | X1 | S2(b), X3(a) |
| U(a,b) |  |  |  | S2, S3 |  | S2(b), X3(a) |
|  | R(b) |  |  | S2, S3 | S2 | X3(a) |
|  | Commit |  |  | S2, S3 | S2 | X3(a) |
|  | U(a,b) |  |  | S3 |  | X3(a) |
|  |  | W(a) |  | X3 |  |  |
|  |  | R(A) |  | X3 |  |  |
|  |  | Commit |  | X3 |  |  |
|  |  | U(a) |  |  |  |  |

# Question 5

1. First we are going to need to access the root (1) then the intermediate node (2) and finally the leaf page where the entry should be placed (3). Then in the best case we are only going to access 3 index pages. Now for the worst case the leaf page is full so we need to split it and insert back in the parent page (3+1). In the worst case the intermediate is also full so we need to split again and put in the root node(5) but if the root is also full then we need to create a new root and splitting the current root (6)
2. This query return all the student that took a given course at a given semester.

We know that we have 400 000 entries and 10 different term in the table enrolled and 5000 courses. Then it means that at a given term there is 400 000/10=40 000 student course mapping. But as we have 5000 courses each courses is taken by only 40 000/5000=8 students on average. Then the query will return 8 tuples on average.

1. First the cost of the block nested loop is

Now as the selection is done on the fly it’s at no additional cost and same for the projection.

