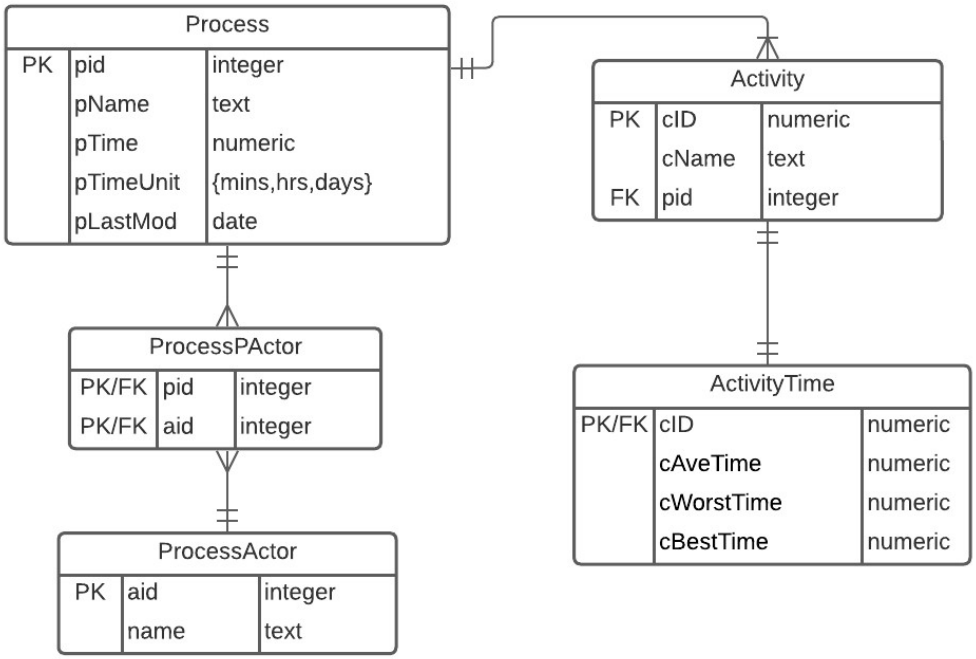
CS5200
Assignment 3




**ProcessActor**

This is a table that records the information of process actor.

Proof: For the ProcessActor table, there is no multivalued attribute (is in 1NF). “aid” is the primary key, and “name” is fully functional dependent on primary key. So, it is in 2NF (Since it is a single primary key, there is no problem with partial dependency). The “aid” alone can determine name and there is no transitive dependency. So, it is in 3NF.

$$aid \rightarrow name$$

**ProcessPActor**

This table is generated to handle the many-to-many relationship between table Process and table ProcessActor. It has two attributes. The two attributes are both foreign key and composite primary key.

Proof: For the ProcessPActor table, there is no multivalued attribute (is in 1NF). “pid” and “aid” are composite primary key, and “name” is fully functional dependent on primary key. There is no other attribute, so it is in 3NF.

$$aid, pid$$

**Process**

This is a table that records the information of process.

Proof: For the Process table, there is no multivalued attribute (is in 1NF). “pid” is the primary key, and other attributes are fully functional dependent on primary key. Actually, if “pid” is the only PK and in 1NF it is automatically in 2NF. Also, there is no transitive dependency, so it is in 3NF.

$$pid \rightarrow pName, pTime, pTimeUnit, pLastMod$$

**Activity**

This is a table that records the information of activity.

Proof: For the Activity table, there is no multivalued attribute (is in 1NF) after making “cTime” a single table. “cId” is the primary key, and other attributes are fully functional dependent on primary key. So, it is in 2NF. Also, there is no transitive dependency, so it is in 3NF.

$$cId \rightarrow cName, pid$$

**ActivityTime**

The “cTime” is a non-atomic attribute in the original activity table. This table is generated to separate the attribute independently.

Proof: For the ActivityTime table, there is no multivalued attribute (is in 1NF). “cId” is the primary key also the foreign key, and other attributes are fully functional dependent on primary key. So, it is in 2NF. Also, there is no transitive dependency, so it is in 3NF.

$$cId \rightarrow cAveTime, cWorstTime, cBestTime$$

| Entity | Attribute | Definition/Description | Type | Comments/Example |
|---|---|---|---|---|
| Process | pid | unique identifier | integer | artificial PK, e.g., 332 |
| | pName | the name of the process | text | "Register for a Course" |
| | pTime | the average flow time for the process, expressed in "time units" | Numeric | 120 |
| | pTimeUnit | the unit in which the flow time is expressed | value set | mins |
| | pLastMod | the last time the process has been updated or modified | date | 12/09/2022 |
| ProcessActor | aid | unique identifier | integer | artificial PK, e.g., 100 |
| | name | name of the process actor | text | "Accounting", "Registrar" |
| Activity | cID | unique identifier (PK) | numeric | artificial PK, e.g., 99876 |
| | cName | name of the activity | text | "check matriculation status" |
| | pid | foreign key | integer | activity belongs to some process, e.g., 332 |
| ProcessPActor | pid | foreign key/composite primary key | integer | id of the specific process, e.g., 332 |
| | aid | foreign key/composite primary key | integer | if of the the specific actor, e.g., 100 |
| ActivityTime | cID | unique identifier (PK)/foreign key | numeric | the corresponding activity, e.g., 99876 |
| | cAveTime | average execution time in seconds | numeric | 23 |
| | cWorstTime | worst execution time in seconds | numeric | 28 |
| | cBestTime | best execution time in seconds | numeric | 18 |