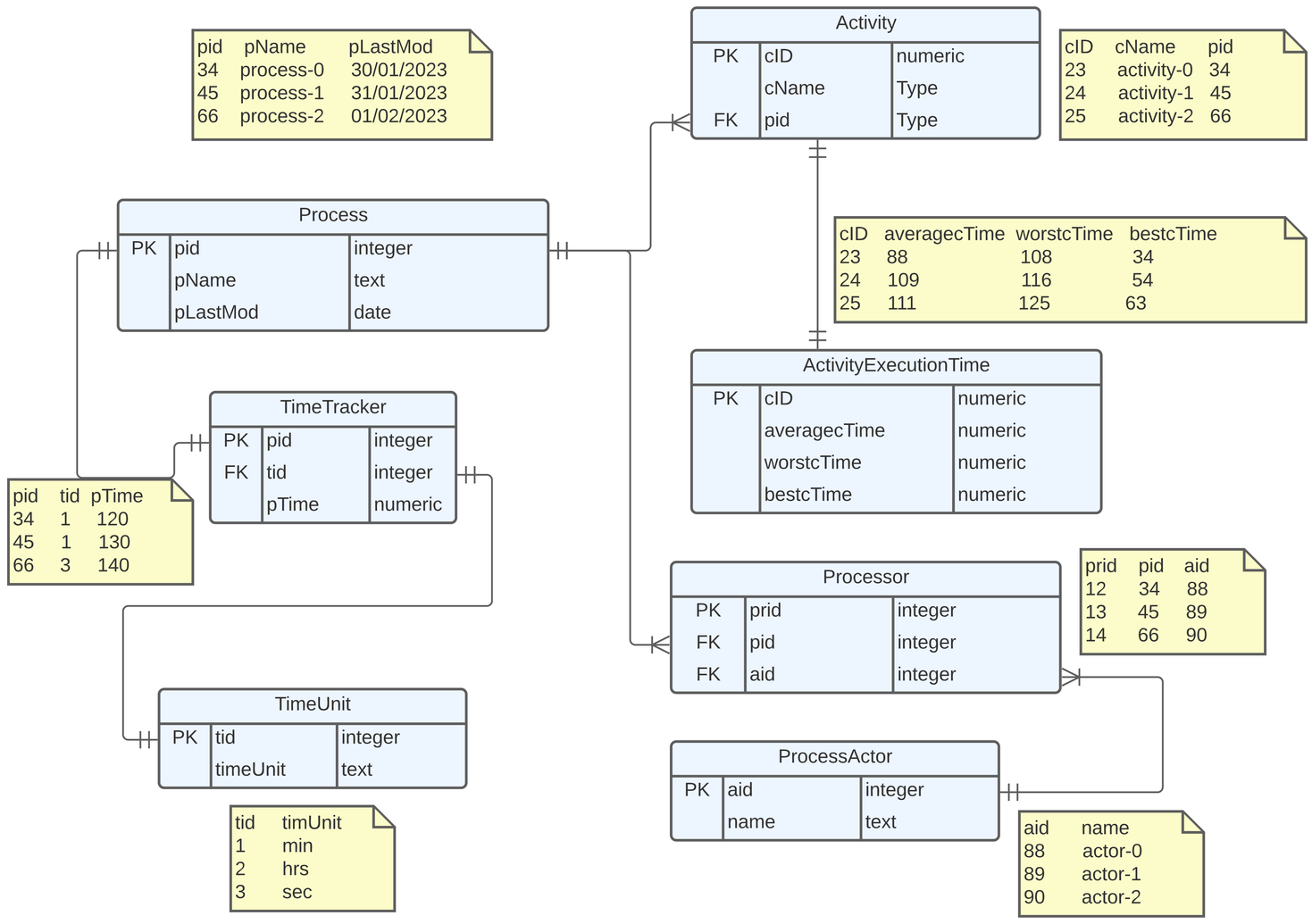
NORMALIZATION OF ERD



1NF

In Process table, field- pTimeUnit and pTime was broken by addition of new Tables TimeTracker and TimeUnit to maintain the atomicity. In Activity table, the column with multiple data numeric[3] was split to have separate columns - averagecTime, worstcTime, bestcTime**.** Many to many relationships create uncertainty and duplications on data as a single processor can have many processor actor which will lead to duplicate records in tables and will end up with an error when we try to insert records with same value . Hence a joint table has been created to store the primary keys of both the relational tables and a surrogate key (prid) will be created. When we want to retrieve the process actors,who are performing a process, we need to use JOIN on select queries on Processor Table, to get the complete record.

2NF

In Activity table, all the attributes, averagecTime, worstcTime, bestcTime,cName, pid are all dependent on the primary key cID and can't be identified uniquely by using any other attribute (ie) there is no candidate key. Likewise in Process table, all attributes pName,pTime, tid, pLastMod cannot uniquely identify the records by themselves or as combined. They rely on primary key- pid for any retrieval and there exist no non-key dependencies. So there are no functional dependencies existing between the columns. Since ProcessActor table has only two columns this table is also in 2NF. Hence the entire ERD diagram is in 2NF. In initial ER diagram, we had time unit dependednt on the time, but we, moved the time to a separate table called TimeTracker. But after doing this change,this table is aslo in 2NF.

3NF

From the notes added for each relations, we can see the dummy values for each tables and all column values are unique and can get be retrived using SQL queries without errors. We can conclude from the below table that all tables are im 3NF because all columns are dependent on primary key and there are no transtive dependencies.

Relation Name	Primary key	Functional Dependencies	in 3NF?
Process	pid	FD={pid->pName, pid -> pTime, pid->tid, pid->pLastMod}	Yes
Activity	cID	FD={cID->cName, cID->pid}	Yes
ActivityExecutionTime	cID	FD={cID->averagecTime, cID->worstcTime, cID->bestcTime}	Yes
TimeTracker	pid	FD={pid->tid, pid->pTime}	Yes
TimeUnit	tid	FD={tid->1,tid->timeUnit}	Yes
ProcessActor	aid	FD={aid->name}	Yes