

# Proofs of 3NF Compliance

## Document Table:

- $\text{doc\_id} \rightarrow \text{name}, \text{file\_path}$
- **doc\_id** is the primary key, and both **name** and **file\_path** are dependent only on **doc\_id**.
- There are no transitive dependencies since **name** and **file\_path** do not functionally determine any other attribute.

## Pool Table:

- $\text{pID} \rightarrow \text{pName}$
- **pID** is the primary key, and **pName** is dependent only on **pID**.
- No transitive dependencies are present.

## Activity Table:

- $\text{aid} \rightarrow \text{poolID}, \text{aName}, \text{aTime}, \text{aTimeUnitID}$
- **aid** is the primary key, and all other attributes are fully functionally dependent on **aid**.
- **aTimeUnitID** is a foreign key that references the **aTimeUnit** table, removing the partial dependency that existed with the original **aTimeUnit** attribute.

## ActivityTime Table:

- $\text{aTimeUnitID} \rightarrow \text{aTimeUnit}$
- **aTimeUnitID** is the primary key, and **aTimeUnit** is dependent only on **aTimeUnitID**.
- This table is normalized to avoid repeating the time unit values in the **Activity** table.

## ActivityDocument Table:

- $\text{adID} \rightarrow \text{doc\_id}, \text{aid}$
- **adID** is the primary key, with **doc\_id** and **aid** as foreign keys.
- This associative entity resolves the many-to-many relationship between **Document** and **Activity** and does not have any transitive dependencies.

All the tables listed above are in 3NF because:

- They are all in 2NF (no partial dependency of any non-prime attribute on a part of a candidate key).
- They have no transitive dependency (no non-prime attribute is dependent on another non-prime attribute).