Justify Statement

1. Entity Type

Overall, we have 9 entities, which are "Person", "Officials", "Participants", "SportingEvents", "Journeys", "Vehicle", "Location", "Accomodation", and "Venue". Among these 9 entities, we have "Journeys" as a weak entity. "Journeys" was chosen to be a weak entity since it does not have a self-contained primary key, what's more, the existence of "Journeys" must depend on the existence of the "Vehicle" entity.

2. Relation Types

Overall, we have 8 relations, which are "From", "To", "Scheduled", "Books", "Run", "Participate", "LivesIn" and "HoldAt".

3. Attributes

By looking through the description, attributes of each entity and relations are listed in the above ER diagram.

4. Primary Keys

For "Location", we have "LocationId" as the primary key, each "Location" has a unique and not null "LocationId". Since "Accomodation" and "Venue" are inherited from "Location", which means "Accomodation" and "Venue" are subclasses of "Location", thus both "Accomodation" and "Venue" has the same primary key as "Location", which is "LocationId". For "Person", we have "PersonId" as the primary key, each "Person" has a unique and not null "PersonId". Because "Officials" and "Participants" are inherited from "Person", which means "Officials" and "Participants" are subclasses of "Person", thus both "Officials" and "Participants" has the same primary key as "Person", which is "PersonId". For "SportingEvents", we have "EventId" as the primary key, each "SportingEvents" has a unique and not null "EventId". For "Vehicle", we have "Code" as the primary key, each "Vehicle" has its own unique alphanumeric "Code". Lastly, For "Journeys", as "Journeys" is a weak entity that does not have a self-contained primary key, we have "Date" and "DepartureTime" as the discriminator. The primary key of "Journeys" is formed by the primary key of the Vehicle (Code) plus "Date" and "DepartureTime".

5. Constraints

Firstly, every "Person" lives in exactly one "Accomodation", which is a N:1 relationship and can be represented by a thick arrow in the ER diagram. Secondly, every "SportingEvents" hold at exactly one "Venue", which is a N:1 relationship and can be represented by a thick arrow in ER diagram. Thirdly, every "Journeys" transferred from and transferred to exactly one "Location", which is N:1 relationship, both can be represented by a thick arrow in ER diagram. Fourthly, every "Journeys" can be scheduled from exactly one "Vehicle", which is N:1 relationship, and can be represented by a thick arrow in ER diagram. Besides, "Accomodation" and "Venue" are inherited from "Location", in which "Location" is the superclass of "Accomodation" and "Venue". Since Location can only be either "Accomodation" or "Venue", This satisfied disjoint overlap constraints. "Officials" and "Participants" are inherited from "Person", in which "Person" is the superclass of "Officials" and "Participants". Since Person can only be either "Officials" or "Participants", This satisfied disjoint overlap constraints.

6. Design Specialities

In our ER diagram, we have 1 weak entity "Journeys" that existence depends on the existence of "Vehicle". "Journey" has partial key "Date" and "DepartureTime". The primary key of "Journey" is formed by "Code"(primary key of "Vehicle") plus "Date" and "DepartureTime". In addition, we have 2 IsA-relationship, where "Person" is the superclass of "Officials" and "Participants"; and "Location" is the superclass of "Accomodation" and "Venue".