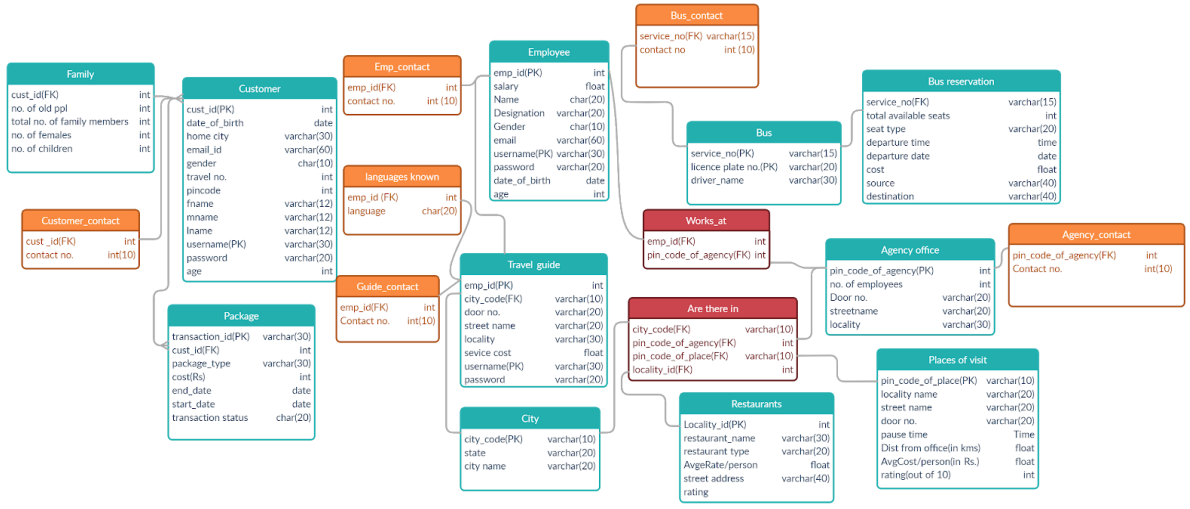
ER to Relational model:



Explanation:

- For all regular entity types E, created a relation E, which contains all simple attributes of E and simple component attributes of composite attributes are included.
- For all weak entity types E ,created a relation E ,with all its simple attributes ,and primary key of owner entity type E' as foreign key.
- For multivalued attributes ,made new relation which includes the multivalued attribute and primary key of the relation (as foreign key){all orange coloured tables}.
- For 1:1 and 1:n relationships ,used foreign key approach ,which means take a primary key of one entity type and add it as foreign key of another entity type ,which has full participation on its side.
- For m:n relationship types ,created a new relation E which has primary keys of both the parent entity types. {all red coloured tables}
- Subclasses inherit all the attributes of superclass,when there are multiple subclasses , and inherits only the primary key of superclass if only one subclass exists.

In entity type *Places of visit* , attribute *restaurants nearby* is removed,as we can get it through joins on *restaurants* , *are there in* , and *places of visit*

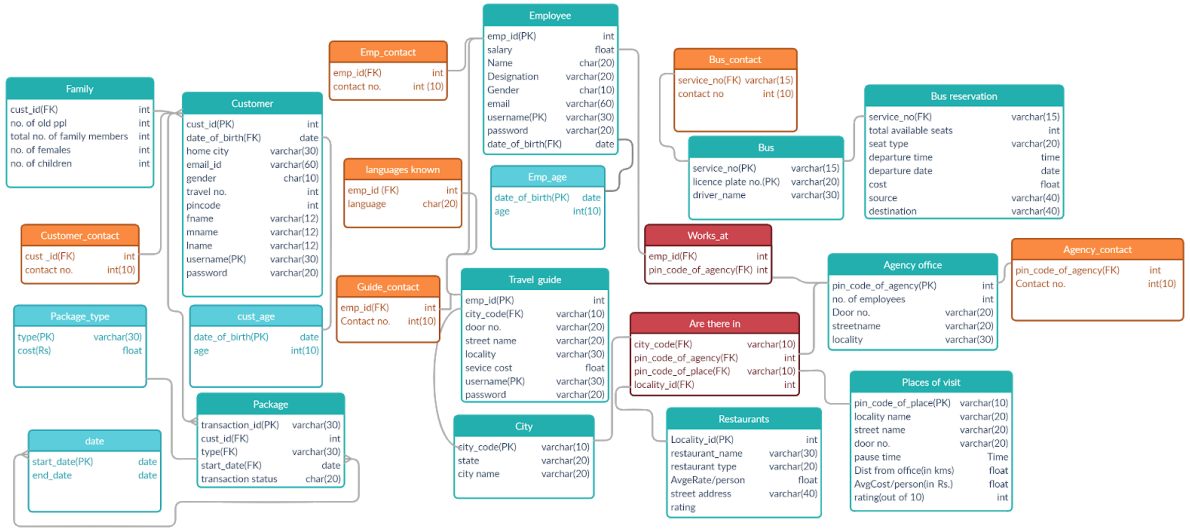
Relational Model after conversion to 1 NF:

The above ER is already in 1 NF, as it has atomic values for all attributes , multivalued attributes are made into new relations and for all the composite attributes corresponding simple attributes are taken.

Relation model after conversion into 2NF:

The above ER is already in 2NF as all the primary keys in are single attributes,hence this test need not be applied at all.

Relation model after conversion into 3NF:



We had 4 transitive dependencies:

1) Start_date ->end_date in relation Packages ,as enddate can be derived from start_date ,based on the package chosen.
2) Cost for each person depends on package type ,hence type ->cost is a transitive dependency.
   [NOTE:cost is same for people of all ages]
3)
   a) Age is derived from date of birth ,hence dob->age is transitive dependency.
   b) Attribute “age” and “dob” are in two tables ,employee and customer, hence 4 transitive dependencies.

Hence for all these transitive dependencies ,we created new tables considering the left side attribute of transitive dependency as a joining attribute with the parent table.
Tables added at this stage are in skyblue colour.

NOTE:The attribute “cost” in table “bus_reservation” signifies the amount paid by the agency to book a bus (trip basis),which is adjusted in the cost of the package.