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**Module: 5COSC020C – Database Systems**

**Module Leader: Mr. Ragu Sivaraman**

**INDIVIDUAL COURSEWORK - Part A**

**Informatics Institute of Technology**

**Department of Computing**

**(B.Eng.) in Software Engineering**

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# 1. Conceptual ERD for ArchipelagoCrazy (Part – A).

Diagram, schematic

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# 2. Data dictionary to document entities for ArchipelagoCrazy

# (Part–A).

|  |  |
| --- | --- |
| *Entity name* | *Description* |
| w1810872\_Island | General term describing all islands with attractive sites including mainland, that belong to ArchipelagoCrazy. |
| w1810872\_Boat | General term describing all types of boats that belong to ArchipelagoCrazy. |
| w1810872\_Customer | General term that describes all customers of ArchipelagoCrazy. |
| w1810872\_Booking | General term that describes bookings placed for services offered by ArchipelagoCrazy. |
| w1810872\_Adventure | General term that describes all adventures organised by ArchipelagoCrazy. |
| w1810872\_Employee | General term describing all staff members employed by ArchipelagoCrazy. |
| w1810872\_BoatService | General term describing all types of services done to boats. |
| w1810872\_Meal | General term describing all meals organized by ArchipelagoCrazy. |

|  |  |  |
| --- | --- | --- |
| *General entity* | *Specialized entity* | *Explanation* |
| w1810872\_Boat | w1810872\_LargMotorizedBoat | A specialized term that describes large boats which can handle higher number of customers. |
| w1810872\_PaddlePropelledBoat | A specialized term that describes a boat which can be used for marine exploration. |
| w1810872\_SmallMotorizedBoat | A specialized term that describes small boat which can be used for local beach taxi service. |
| w1810872\_Adventure | w1810872\_SeaAdventure | A specialised term that describes adventures related to sea. |
| w1810872\_LandAdventure | A specialised term that describes adventures related to land. |
| w1810872\_SeaAdventure | w1810872\_SeaCrossing | A specialised term describing the sea adventure of crossing between one or more islands. |
| w1810872\_BeachTaxiService | A specialised term describing the sea adventure of moving between beaches. |
| w1810872\_MarineExploration | The specialised term that describes the sea adventure of exploring islands, accessing remote bays and creeks. |
| w1810872\_LandAdventure | w1810872\_VisitLandmark | A specialised term that describes the land adventure of visiting landmark. |
| w1810872\_WalkingTour | A specialised term that describes the land adventure of a walking tour with a guid. |
| w1810872\_Emplyee | w1810872\_Guid | A specialised term that describes the tour guid who guides customers as an employee |
| w1810872\_SeaCrewMember | A specialised term for members of the sea crew who organises and manages boat service as an employee. |
| w1810872\_BoatMechanic | A specialised term that describes boat mechanics who services boats as an employee. |

# 3. Data Dictionary to document relationships and multiplicities for ArchipelagoCrazy (Part – A).

## 3.1. Binary Relationships.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Entity name* | *Multiplicity* | *Relationship* | *Multiplicity* | *Entity name* | *Justifications for the multiplicity*  *(4 statements for each*  *relationship)* |
| w1810872\_Island | 1..1 | has | 1..\* | w1810872\_Adventure | An island must have at least one adventure |
| An island may have many adventures |
| An adventure must belong to at least one island |
| An adventure must belong to one and only one island |
| w1810872\_Customer | 1..1 | places | 1..\* | w1810872\_Booking | One customer must place at least one booking |
| One customer may place many bookings |
| One booking must belong to at least one customer |
| One booking must belong to one and only one customer |
| w1810872\_Boat |  | carries |  | w1810872\_Customer | A boat may or may not carry a customer to an island. |
| A boat may carry many customers to one islands. |
| A customer must use at least one boat to visit an island. |
| A customer must use one and only one boat to visit an island. |
| w1810872\_Booking | 0..\* | consists of | 1..\* | w1810872\_Adventure | One booking consists of at least one adventure |
| One booking may consist of many adventures |
| One adventure may or may not be booked. |
| One adventure may or may be booked by many. |
| w1810872\_LargeMotorizedBoat | 0..1 | carries | 0..\* | w1810872\_Customer | A large motorized boat may or may not carry any customer |
| A large motorized boat may carry many customers. |
| A customer may or may not be carried by any large motorized boat. |
| A customer must be carried by one and only one large motorized boat. |
| w1810872\_PaddlePropelledBoat | 0..1 | carries | 1..2 | w1810872\_Customer | A paddle boat must carry at least one customer |
| A paddle boat can carry a maximum of two customers |
| A customer may or may not be carried by a paddle boat |
| A customer may be carried by one and only one paddle boat |
| w1810872\_SmallerMotorizedBoat | 0..1 | carries | 0..8 | w1810872\_Customer | A small motorized boat may or may not carry any customer. |
| A small motorized boat may carry a maximum of eight customers. |
| A customer may or may not be carried by any small motorized boat. |
| A customer may be carried by one and only one small motorized boat. |
| w1810872\_Guid | 1..1 | runs | 0..1 | w1810872\_LandAdventure | One guide may or may not run any land adventure. |
| One guide may run one and only one land adventure |
| One land adventure must be run by at least one guide |
| One land adventure must be run by one and only one guide |
| w1810872\_SeaCrewMember | 1..\* | manages | 0..\* | w1810872\_SeaAdventuere | One member of sea crew may or may not manage any sea adventure |
| One sea crew member may manage many sea adventures |
| One sea adventure must be managed by at least one member of sea crew |
| One sea adventure may be managed by many sea crew members |
| w1810872\_SeaCrossing | 0..1 | uses | 1..1 | w1810872\_LargeMotorizedBoat | One sea crossing must use at least one large motorized boat. |
| One sea crossing must use one and only one large motorized boat. |
| One large motorized boat may or may not be used for an sea crossing. |
| One large motorized boat may be used for one and only one sea crossing. |
| w1810872\_BrachTaxiService | 0..1 | uses | 1..1 | w1810872\_SmallerMotorizedBoat | One beach taxi service must use at least one smaller motorized boat. |
| One beach taxi service may use one and only one smaller motorized boat. |
| One smaller motorized boat may or may not be used by any beach taxi service. |
| One smaller motorized boat may be used for one and only one beach taxi service. |
| w1810872\_MarineExploration | 0..1 | uses | 1..1 | w1810872\_PaddlePropelledBoat | One marine exploration must use at least one paddle boat |
| One marine exploration may use one and only one paddle boat |
| One paddle boat may or may not be used by any marine exploration |
| One paddle boat may be used by one and only one paddle boat |
| w1810872\_SeaCrossing | 1..1 | provides | 0..\* | w1810872\_Meal | One sea crossing may or may not provide a meal. |
| One sea crossing may provide many meals. |
| One meal must be provided by at least one sea crossing |
| One meal may be provided by one and only one sea crossing |

## 3.2. Turnery Relationships.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Entity name* | *Multiplicity* | *Relationship* | *Multiplicity* | *Entity name* | *Justifications for the multiplicity* |
| w1810872\_Boat | 1..1 | carries | 0..\*  1..1 | w1810872\_Customer  w1810872\_Island | A boat may or may not carry any customer to at least one island. |
| A boat may carry many customers to one and only one island. |
| A customer may be carried to at least one island by at least one boat |
| A customer may be carried to one and only one island by one and only one boat |
| An island may or may not be carried customers by at least one boat. |
| An island may be carried many customers by one and only one boat. |
| w1810872\_BoatMechanic | 0..\* | provides | 0..\*  0..\* | w1810872\_BoatService  w1810872\_Boat | One Boat mechanic may or may not provide any boat service to any boat. |
| One boat mechanic may provide many services to many boats. |
| One boat service may or may not be provided to any boat by any boat mechanic. |
| One boat service may be provided to many boats by many boat mechanics. |
| One boat may or may not be provided any service by any boat mechanic. |
| One boat may be provided many services by many boat mechanics. |

# 4. Data dictionary to document attributes and primary keys for each entity for ArchipelagoCrazy (Part – A).

|  |  |  |
| --- | --- | --- |
| *Entity name* | *Attribute for this entity* | *justification* |
| w1810872\_Island | w1810872\_islandId {PK}  w1810872\_islandName  w1810872\_location | To uniquely identify every island  Ever island has a name  Every island has its own geographic location |
| w1810872\_Boat | w1810872\_boatId {PK}  w1810872\_condition  w1810872\_boatType  w1810872\_capacity | Uniquely identifies a boat  About the condition status of the boat  Type of the boat  Capacity of each boat |
| w1810872\_LargeMotorizedBoat | w1810872\_currentLocation | Current location where the large, motorized boat is |
| w1810872\_PaddlePropelledBoat | w1810872\_locationToVisit | Location it must visit if available |
| w1810872\_SmallerMotorizedBoat | w1810872\_currentBeach | Current beach it is located in |
| w1810872\_Customer | w1810872\_customerId {PK}  w1810872\_customerName  w1810872\_fName  w1810872\_lName  w1810872\_emailAddress | Uniquely identifies a customer  First name of customer  Last name of customer  E-mail address of customer |
| w1810872\_Booking | w1810872\_bookingId {PK}  w1810872\_bookingDate  w1810872\_duration | Each booking has a number to uniquely identify  Date the booking was made  Time duration taken for a particular event booked |
| w1810872\_Adventure | w1810872\_adventureId {PK}  w1810872\_adventureType  w1810872\_timeDuration | Each adventure has a unique ID number  Type of adventure  Time consuming to complete adventure |
| w1810872\_SeaAdventure | w1810872\_requirement  w1810872\_numberOfGuests | Requirements for the sea adventure  Number of guests participating in an adventure |
| w1810872\_SeaCrossing | w1810872\_crossingLocation  w1810872\_mealRequired | To which island is the sea crossing is for  Whether a meal is required or not |
| w1810872\_BeachTaxiService |  |  |
| w1810872\_MarineExploration |  |  |
| w1810872\_LandAdventure | w1810872\_description | Short description about the land adventure |
| w1810872\_VisitLandmark |  |  |
| w1810872\_WalkTour |  |  |
| w1810872\_Employee | w1810872\_emplyeeId {PK}  w1810872\_name  w1810872\_fName  w1810872\_lName  w1810872\_Address  w1810872\_street  w1810872\_city  w1810872\_postcode  w1810872\_tellNo[1..3] | Each employee has an ID to be uniquely identified  First name of employee  Last name of employee  Street name of address of employee  City of employee’s address  Postcode of address  Telephone number of each employee |
| w1810872\_Guid | w1810872\_specializedArea | Specialise area of study regarding various landmarks |
| w1810872\_SeaCrewMember | w1810872\_licenseNumber | Diving/ Swimming license number of each sea crew member |
| w1810872\_BoatMechanic |  |  |
| w1810872\_BoatService | w1810872\_serviceId {PK}  w1810872\_serviceName  w1810872\_serviceType | To uniquely identify each service  Name of service  Type of service based on various parts of boat |
| w1810872\_Meal | w1810872\_mealId {PK}  w1810872\_description  w1810872\_veg | Uniquely identifies each meal  Short description about what is included in the meal  Is the meal vegetarian or non-vegetarian |

# Part B Questions.

# 5. Logical ERD for SoundStuff.