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Database Systems

5COSC020C.1

Part A

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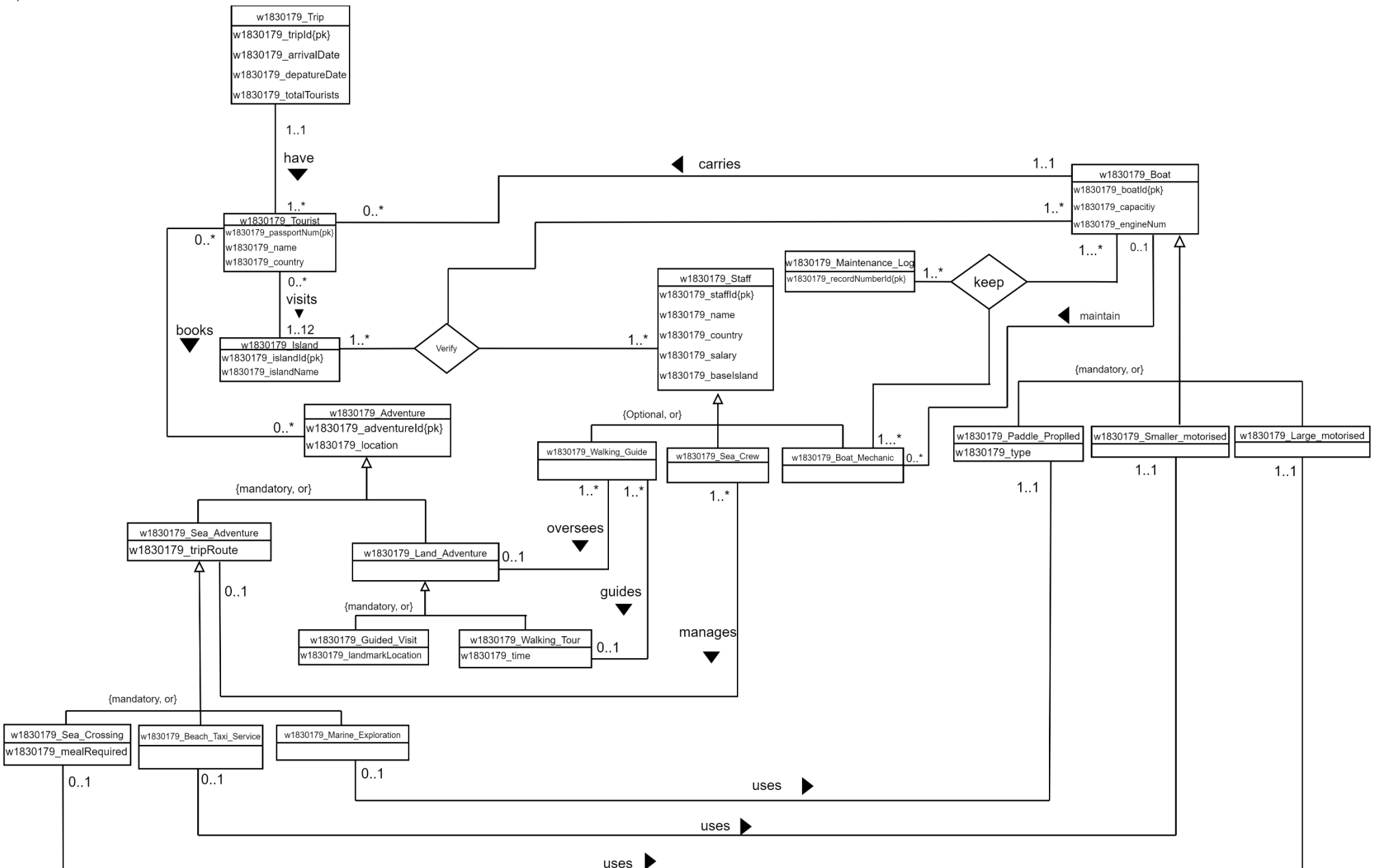
IIT Number – 20200459

Tutorial Group – K

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## 1) CONCEPTUAL ERD



## Assumptions

1. I assume that one trip can be arranged for multiple tourists. As an example, tourists can come in as groups such that causes Archipelago Crazy only keep one record of that entire tour group.
2. I assume that there can be more staff types except for the three types given in the case study. So, I assume that participant constraint should be mandatory. And the disjoint constraint should be or because it strictly says that roles are specialized one staff can only be one, they cannot overlap.
3. I assume that they maintenance a maintain log because in the case study they have given they should record every service carefully and I assume that it should done by boat mechanics.
4. I assume that guided visit does not requires a walking guide (in the case study they have not specifically mentioned it. But have specifically mentioned a walking tour has a guide) guided visit can be a guideline tour which gives only guidelines before the tour.
5. I assume that every tourist must at least visit one island.

## 2) Data Dictionary to document how I identified the entities

Entity Name	Brief Description
w1830179_Tourist	General term describing all tourists who arrange trips from ArchipelagoCrazy.
w1830179_Boat	General term describing all boats which ArchipelagoCrazy use to provide services that tourist require.
w1830179_Adventure	General term describing all adventures ArchipelagoCrazy provides.
w1830179_Staff	General term describing all staff employed by ArchipelagoCrazy.
w1830179_Island	General term describing all islands which ArchipelagoCrazy organizes trips.
w1830179_Trip	General term describing all trips which ArchipelagoCrazy organizes.
w1830179_Maintenances_Log	General term describing all maintenance records which ArchipelagoCrazy keep on their boats.

General entity	Specialized entity	Brief Explanation
w1830179_Boat	w1830179_Large_Motorised	A general term to describe boats that can carry higher number of passengers in it. This boat type used to carry passengers from the mainland to the islands.
	w1830179_Small_Motorised	A general term to describe boats that can carry between only 6 to 8 people in it. And this is used to provides a local taxi service.
	w1830179_Paddle_propelled	A general term to describe boats that is used carry passengers to more remote bays and creeks.
w1830179_Adventure	w1830179_Sea_Adventure	A general term to describe all adventures which take place at sea. This entity has three more specialized entities.
	w1830179_Land_Adventure	A general term to describe all adventures which take place at land.
w1830179_Sea_Adventure	w1830179_Sea_Crossing	Traveling between islands using lager motorised boat, with having a meal on board if required.
	w1830179_Beach_Taxi Service	A general term to describe travelling among beaches using smaller motorised boats.
	w1830179_Marine_Exploration	A general term to describe exploring remote areas in sea using a paddle-propelled boat.
w1830179_Land_Adventure	w1830179_Guided_Visit	A general term to describe visiting landmarks in the area.
	w1830179_Walking_Tour	A general term to describe land tours which can be nocturnal if required and this requires guide to guide them
w1830179_Staff	w1830179_Sea_Crew	A general term to describe Staff which organizes and manages sea adventures for ArchipelagoCrazy.
	w1830179_Walking_Guide	A general term to describe Staff which employs by ArchipelagoCrazy to organizes and manages land adventures for.
	w1830179_Boat_Mechanic	A general term to describe Staff which maintenance all the boats which used by ArchipelagoCrazy.

### 3) A data dictionary to document how I identified the relationships and multiplicities

Entity name	Multiplicity	Relationship	Multiplicity	Entity name	Brief justifications for the multiplicity (4 statements for each relationship)
w1830179_Trip	1..1	have	1.. *	w1830179_Tourist	One trip may have one tourist on it. without a single tourist a trip may not exist.
					One trip may have many tourists on it. Because tourist can come in as groups.
					One tourist must have one trip.
					One tourist can only have up to one trip.
W1830179_Tourist	0.. *	visits	1..12	W1830179_Island	One tourist visits at least one island. Tourist must at least visit one island.
					One tourist can only visit up to twelve islands.
					One island may not have any tourist visiting it.
					One island may have many tourists visiting it.
W1830179_Tourist	0.. *	books	0.. *	W1830179_adventure	One tourist can book no adventure.
					One tourist can book many adventures.
					One adventure can be book by no tourist.
					One adventure can be book by many tourists.

W1830179_Boat	1..1	carries	0..*	W1830179_Tourist	One boat may be not carrying any tourist on it. Boats can go without tourist to get serviced.
					One boat can carry many tourists on it.
					One tourist can be carried by one boat.
					One tourist can be carried by only one boat.
w1830179_Walking_Guide	1..*	oversee	0..1	w1830179_Land_Adventure	One walking guide may not oversee any land adventure.
					One walking guide can only oversee up to one land adventure.
					One land adventure can be overseen by at least one walking guide.
					One land adventure can be overseen by many walking guides.
w1830179_Walking_Guide	1..*	guides	0..1	w1830179_Walking_Tour	One walking guide may not guide any walking tour.
					One walking guide can only guide up to walking tour.
					One walking tour can be guided by at least one walking guide.
					One walking tour can be guided by many walking guides.
W1830179_Sea_Crew	1..*	manages	0..1	W1830179_Sea_Adventure	One sea crew may not manage any sea adventure.
					One sea crew can only manage up to one sea adventure.
					One sea adventure can be managed by at least one sea crew.
					One sea adventure can be managed by many sea crew.



w1830179_Marine_Exploration	0.. 1	uses	1..1	w1830179_Paddle_propelled	One marine exploration uses at least one paddle propelled boat.
					One marine exploration uses up to one paddle propelled boat.
					One paddle propelled boat may not be used in any marine exploration adventure.
					One paddle propelled boat can be used in one marine exploration adventure.
W1830179_Boat	0.. 1	maintain	1.. *	w1830179_Boat_Mechanic	One boat maintained by at least one boat mechanic.
					One boat can be maintained by many boat mechanics.
					One boat mechanic can maintain no boats.
					One boat mechanic can maintain up to one boat.
w1830179_Beach_Taxi_Service	0.. 1	uses	1..1	w1830179_Smaller_Motorised	One beach taxi service uses at least one smaller motorised boat.
					One beach taxi service uses up to one smaller motorised boat.
					One smaller motorised boat may not be used in any beach taxi service.
					One smaller motorised boat can be used in one beach taxi service.

w1830179_Sea_Crossing	0..1	uses	1..1	w1830179_Large_Motorised	One Sea crossing adventure uses at least one Large motorised boat.
					One Sea crossing adventure uses up to one Large motorised boat.
					One Large motorised boat may not be used in any Sea crossing adventure.
					One Large motorised boat can be used in one Sea crossing adventure.
w1830179_Staff	1..*	Verify	1..*	w1830179_Boat	One staff member verifies at least one boat in one island.
			1..*	w1830179_Island	One staff member may verify many boats in many islands
w1830179_Boat	1..*	Verify	1..*	w1830179_Staff	One boat at least verifies by one staff in one island.
			1..*	w1830179_Island	One boat may be verified by many staff members at many islands.
w1830179_Island	1..*	Verify	1..*	w1830179_Staff	One island verifies at least one boat from one staff member.
			1..*	w1830179_Boat	One island may verify many boats from many staff members.
w1830179_Boat_Mechanic	1..*	Keeps	1..*	w1830179_Maintenances_Log	One boat mechanic may at least keep one maintenance log for one boat.
			1..*	w1830179_Boat	One boat mechanic may keep many maintenance logs for many boats.

w1830179_Boat	1.. *	Keeps	1.. *	w1830179_Maintenances_Log	One boat at least keeps one maintenances log from one boat mechanic.
			1.. *	w1830179_Boat_Mechanic	One boat may keep many maintenances log from many boat mechanics.
w1830179_Maintenances_Log	1.. *	Keeps	1.. *	w1830179_Maintenance_Log	One maintenances log is at least kept for one boat from one boat mechanic.
			1.. *	w1830179_Boat_Mechanic	One maintenances log can be kept from many boat mechanics for many boats.

#### 4) Data dictionary to document how I identified the attributes and primary keys

Entity name	Attributes for this entity (include PK)	Justification
w1830179_Trip	w1830179_tripId{pk}	Uniquely identifies a trip.
	w1830179_arrivalDate	Arrival date of the tourist or the tourist groups.
	w1830179_depatureDate	Departure date of the tourist or the tourist groups.
	w1830179_totalTourists	Number of tourists involved in the trip.
w1830179_Tourist	w1830179_passportNum{pk}	Uniquely identifies a tourist.
	w1830179_name	Name of the tourist.
	w1830179_country	Country of the tourist.
w1830179_Island	w1830179_islandId{pk}	Uniquely identifies an island.
	w1830179_islandName	Name of the island.
w1830179_Adventure	w1830179_adventureId{pk}	Uniquely identifies an adventure.
	w1830179_location	Adventure held location.
w1830179_Sea_Adventure	w1830179_boatId	Id of the boat used in the sea adventure.
	w1830179_tripRoute	Trip rout of the adventure.
w1830179_Guided_Visit	w1830179_landmarkLocation	Location of the visiting landmark.
w1830179_Walking_Tour	w1830179_time	Time of the tour nocturnal or not nocturnal.
w1830179_Sea_Crossing	w1830179_mealRequired	Meal required in the adventure it can be null as well.
w1830179_Maintenance_Log	w1830179_recordNumberId{pk}	Uniquely identifies a maintenance log.
w1830179_Boat	w1830179_boatId{pk}	Uniquely identifies a boat
	w1830179_capacitiy	Capacity of the boat.
	w1830179_engineNum	Engine number.
w1830179_Paddle_Proplled	w1830179_type	Type of the paddle propelled boat.

w1830179_Staff	w1830179_staffId{pk}	Uniquely identifies a staff member.
	w1830179_name	Name of the staff member
	w1830179_country	Original country of the staff member
	w1830179_salary	Salary of the staff member