**Assignment**

**Section 1. Determine the main statements in this scenario**

1. Australia has six states and various territories.
2. Canberra is the capital of Australia, it is located in the ACT which is a territory of Australia.
3. Melbourne is the capital of the state of Victoria.
4. Brisbane is the capital of the state of Queensland.
5. Melbourne has two airports – Tullamarine and Avalon.
6. Tullamarine airport is served by Qantas, Rex and JetStar flights while Avalon airport is served by Qantas and Rex flights.
7. Melbourne has several train stations, and the main station is Melbourne Central.
8. Public transport in Melbourne covers buses, trams and the railway line, and is broken up into 2 Myki ticketing zones, Zone 1 and Zone 2; as well as the City Saver area.
9. City Saver area is within Zone 1 and covers the Central Business District.
10. Some stations are in the overlap between the two zones (Zone 1 and 2), where tickets for either zone may be used.
11. Brisbane has several train stations, which includes the main station, Brisbane Central, as well as the South Brisbane Station.
12. Brisbane Central is located at the center of Brisbane, whereas the South Brisbane Station is located across Brisbane river.
13. In Melbourne and Brisbane, you can stay in a hotel.
14. Hotels have different ratings and rates, within a price range.
15. Hotel ratings range from five to one star.
16. Price for hotels might range differently depending on the time of year of visit and hotel ratings to Melbourne or Brisbane
17. Canberra, Melbourne and Brisbane are full of sights, such as churches, monuments, museums and family attractions.
18. Places to see in Melbourne include the St Patrick’s Cathedral, a popular church; the Shrine of Remembrance, a popular monument and the Melbourne Museum, a popular museum.
19. Places to see in Canberra includes the Shrine of War Museum, a popular museum.
20. Brisbane is famous for the family attractions such as the Gold Coast theme parks and the Dracula’s Cabaret.
21. The Entry fee for Dracula’s Cabaret is $95AUD for Regular tickets and $115 for VIP tickets.
22. The Entry fee for the Drax4Kids show is $32AUD per person.
23. There are organized tours to see the sights of Melbourne and surrounding regions which include the Great Ocean road and the Yarra valley wineries.
24. Perth has winery tours at Margaret river, along with the Scitech Discovery Museum in the city and tours at the Fremantle prison.
25. While in Melbourne, a visitor should take the opportunity to visit one of the many events such as theatre, opera performances and concerts which take place there during different time periods.
26. Travel guides are available for Perth, Melbourne, Canberra or Brisbane in several formats such as a guidebook or on a CD.
27. Maps of cities can be found in paper format or in an electronic format.

**Section 2 . Determine the elements and logical statements/axioms of a conceptual ontology model.**

1. Australia has six states and various territories.
   * + Australia has both states and regions
2. Canberra is the capital of Australia, it is located in the ACT which is a territory of Australia.

* A city is the capital of a country.
* A city is located in a state or territory.

1. Melbourne is the capital of the state of Victoria.

* A city is a capital of a state.
* Melbourne is located in the state of Victoria.

1. Brisbane is the capital of the state of Queensland.

* A city is the capital of a state.
* Brisbane is located in the state of Queensland.

1. Melbourne has two airports – Tullamarine and Avalon.

* A city can have multiple airports.

1. Tullamarine airport is served by Qantas, Rex and JetStar flights while Avalon airport is served by Qantas and Rex flights.

* Airports are served by multiple airlines.
* Qantas, Rex and JetStar airlines operate flights at the Tullamarine airport.
* Qantas and Rex airlines operate flights at the Avalon airport.

1. Melbourne has several train stations, and the main station is Melbourne Central.

* A city can have multiple train stations.
* There are many train stations in Melbourne.
* The main train station in Melbourne is the Melbourne Central.

1. Public transport in Melbourne covers buses, trams and the railway line, and is broken up into 2 Myki ticketing zones, Zone 1 and Zone 2; as well as the City Saver area.

* Melbourne has public transport.
* Buses are a public transport.
* Trams are a public transport.
* The railway line is a public transport.
* Public transport stations can have multiple ticketing zones.

1. Some public transport stations are in the overlap between the two zones (Zone 1 and 2) where tickets for either zone may be used.

* Public Transport Stations can fall under multiple ticketing zones.
* Same public transportation tickets can be used in some stations.

1. City Saver area is within Zone 1 and covers the Central Business District.

* City Saver area is located within a ticketing zone.

1. Brisbane has several train stations, which includes the main station, Brisbane Central, as well as the South Brisbane Station.

* A city can have many train stations.
* Brisbane has multiple train stations.
* Brisbane Central is the main train station in Brisbane.

1. Brisbane Central is located at the center of Brisbane, whereas the South Brisbane Station is located across Brisbane river.

* A train station is located in any part of a city.

1. In Melbourne and Brisbane, you can stay in a hotel.

* Visitors can stay at hotels in a city.

1. Hotels have different ratings and rates, within a price range.

* Prices vary for different hotels.

1. Hotel ratings range from five to one star.

* Different hotels have different stars based on their ratings.

1. Price for hotels might range differently depending on the time of year of visit and hotel ratings to visit Melbourne or Brisbane

* Price of hotels changes in Melbourne and Brisbane.
* Hotel ratings affects price range.
* Time of year affects price range.

1. Canberra, Melbourne and Brisbane are full of sights, such as churches, monuments, museums and family attractions.

* Cities are full of sights.
* Canberra is full of sights.
* Melbourne is full of sights.
* Brisbane is full of sights.
* Sights include Churches, Monuments, Museums and Family Attractions.

1. Places to see in Melbourne include the St Patrick’s Cathedral, a popular church; the Shrine of Remembrance, a popular monument and the Melbourne Museum, a popular museum.

* Melbourne has Churches, Monuments and Museum.
* St Patrick’s Cathedral is a popular church in Melbourne.
* The Shrine of Remembrance is a popular monument in Melbourne.
* The Melbourne Museum is a popular museum in Melbourne.

1. Places to see in Canberra includes the Shrine of War Museum, a popular museum.

* Canberra has a Museum.
* The Shrine of War museum is a popular museum in Canberra.

1. Brisbane is famous for the family attractions such as the Gold Coast theme parks and the Dracula’s Cabaret.

* Brisbane is famous for family attractions.
* Theme Parks are family attractions.
* Gold Coast theme park is a family attraction.
* Dracula’s Cabaret is a family attraction.

1. The fee to enter Dracula’s Cabaret is $95AUD for Regular tickets and $115 for VIP tickets.

* Dracula’s Cabaret has an entry fee.
* Entry fee tickets are of different types (Regular and VIP).
* Price of the ticket varies based on its type.

1. The fee to enter the Drax4Kids show is $32AUD per person.

* Drax4kids show has an entry fee.

1. There are organized tours to see the sights of Melbourne and surrounding regions which include the great ocean road and the Yarra valley wineries.

* Tours are organized to see the sights of Melbourne and its surrounding regions.
* The Great Ocean Road and the Yarra Valley wineries are located near Melbourne.
* There are organised tours to see the Great Ocean Road.
* There are organized tours to see the Yarra Valley wineries.

1. Perth has winery tours at Margret river, along with the Scitech Discovery Museum in the city and tours at the Fremantle prison.

* Perth has winery tours.
* Perth has a museum, Scitech Discovery Museum.
* Scitech Discovery museum can be toured.
* Perth has a prison, Fremantle prison
* Fremantle prison can be toured.

1. While in Melbourne, a visitor should take the opportunity to visit one of the many events such as theatre, opera performances and concerts which take place there during different time periods.

* Many events take place during different time periods in Melbourne.
* Theatre is an event.
* Opera performance is an event.
* Concert is an event.

1. Travel guides are available for Perth, Melbourne, Canberra or Brisbane in several formats such as a guidebook or on a CD.

* Travel guides are available for different cities.
* Perth has a travel guide.
* Melbourne has a travel guide.
* Canberra has a travel guide.
* Brisbane has a travel guide.
* Travel guides have several formats.
* Travel guide can be a guidebook.
* Travel guide can be on a CD.

1. Maps of cities can be found in paper format or in an electronic format.

* Maps can be in paper.
* Maps can be electronic.

**Section 3. Determine the competency questions of the ontology design using the Ontology Requirements Specification Framework (provided).**

**6. List the Groups of Competency Questions and answers.**

1. Australia has six states and various territories.

* Australia has both states and regions

**CQs:**

* Which country has both states and regions?

1. Canberra is the capital of Australia, it is located in the ACT which is a territory of Australia.

* A city is the capital of a country.
* A city is located in a state or territory.

**CQs:**

* What city is the capital of a certain country?
* In what territory or a state is a certain country located?

1. Melbourne is the capital of the state of Victoria.

* A city is a capital of a state.
* A city is located in a state.
* Melbourne is located in the state of Victoria.

**CQs:**

* What city is the capital of a state?
* In what state is a certain city located?

1. Brisbane is the capital of the state of Queensland.

* A city is the capital of a state.
* Brisbane is located in the state of Queensland.

**CQs:**

* What city is the capital of a state?
* In what state is a certain city located?

1. Melbourne has two airports – Tullamarine and Avalon.

* A city can have multiple airports.

**CQs:**

* Which city has multiple airports?

1. Tullamarine airport is served by Qantas, Rex and JetStar flights while Avalon airport is served by Qantas and Rex flights.

* Airports are served by multiple airlines.
* Qantas, Rex and JetStar airlines operate flights at the Tullamarine airport.
* Qantas and Rex airlines operate flights at the Avalon airport.

**CQs:**

* Which airports are served by multiple airline services?
* Which airlines operate flights at a certain airport?

1. Melbourne has several train stations, and the main station is Melbourne Central.

* A city can have multiple train stations.
* There are many train stations in Melbourne.
* The main train station in Melbourne is the Melbourne Central.

**CQs:**

* Which city has several train stations?
* What is the main station of a certain city?

1. When getting around in Melbourne by public transport there are buses, trams and the railway line, and the stations are broken up into 2 Myki ticketing zones, Zone 1 and Zone 2; as well as the City Saver area.

* Melbourne has public transport.
* Buses are a public transport.
* Trams are a public transport.
* The railway line is a public transport.
* Public transport stations can have multiple ticketing zones.

**CQs:**

* What are the means of getting around in a city?
* Which city has public transport?
* In what city are buses a public transport?
* In what city are trams a public transport?
* In what city is the railway line a public transport?
* In what city are public transports broken up into multiple ticketing zones?

1. Some public transport stations are in the overlap between the two zones (Zone 1 and 2) where tickets for either zone may be used.

* Public Transport Stations can fall under multiple ticketing zones.
* Any zonal tickets can be used in some stations.

**CQs:**

* What public transport stations in a certain city fall under multiple ticketing zones?
* In what public transport stations can any zonal tickets be used?
* City Saver area is within Zone 1 and covers the Central Business District.

1. City Saver area is within Zone 1 and covers the Central Business District.

* City Saver area is located within a ticketing zone.

**CQs:**

* In what zone is a certain area located in a city?
* What district does a certain area cover?

1. Brisbane has several train stations, which includes the main station, Brisbane Central, as well as the South Brisbane Station.

* A city can have many train stations.
* Brisbane has multiple train stations.
* Brisbane Central is the main train station in Brisbane.

CQs:

* What city has several train stations?
* What is the main train station of a certain city?

1. Brisbane Central is located at the center of Brisbane, whereas the South Brisbane Station is located across Brisbane river.

* A train station is located in any part of a city.

CQs:

* In what part of the city is a certain train station located?

1. In Melbourne and Brisbane, you can stay in a hotel.

* Visitors can stay at hotels in a city.

CQs:

* Where can visitors stay in a city?

1. Hotels have different ratings and rates, within a price range.

* Prices vary for different hotels.
* Ratings vary for different hotels.

CQs:

* What are the ratings of a certain hotel?
* What are the rates at a certain hotel?

1. Hotel ratings range from five to one star.

* Different hotels have different stars based on their ratings.

CQs:

* How many star ratings does a certain hotel have?

1. Price for hotels might range differently depending on the time of year of visit and hotel ratings to visit Melbourne or Brisbane

* Price of hotels changes in Melbourne and Brisbane.
* Hotel ratings affects price range.
* Time of year affects price range.

CQs:

* What are the factors that affect the prices of the hotels in a certain city?
* In which city does the price range of hotels vary in different times of the year?

1. Canberra, Melbourne and Brisbane are full of sights, such as churches, monuments, museums and family attractions.

* Cities are full of sights.
* Canberra is full of sights.
* Melbourne is full of sights.
* Brisbane is full of sights.
* Sights include Churches, Monuments, Museums and Family Attractions.

CQs:

* Which cities are full of sights?
* What are the sights that can be explored in a city?

1. Places to see in Melbourne include the St Patrick’s Cathedral, a popular church; the Shrine of Remembrance, a popular monument and the Melbourne Museum, a popular museum.

* Melbourne has Churches, Monuments and Museum.
* St Patrick’s Cathedral is a popular church in Melbourne.
* The Shrine of Remembrance is a popular monument in Melbourne.
* The Melbourne Museum is a popular museum in Melbourne.

CQs:

* What are the places that can be seen in a certain city?
* What is the most popular church in a certain city?
* What is the most popular monument in a certain city?
* What is the most popular museum in a certain city?

1. Places to see in Canberra includes the Shrine of War Museum, a popular museum.

* Canberra has a Museum.
* The Shrine of War museum is a popular museum in Canberra.

CQs:

* Which city has a museum?
* What is the most popular museum in a city?

1. Brisbane is famous for the family attractions such as the Gold Coast theme parks and the Dracula’s Cabaret.

* Brisbane is famous for family attractions.
* Theme Parks are family attractions.
* Gold Coast theme park is a family attraction.
* Dracula’s Cabaret is a family attraction.

CQs:

* What is a certain city famous for?
* What kind of family attractions can be found in a certain city?

1. The fee to enter Dracula’s Cabaret is $95AUD for Regular tickets and $115 for VIP tickets.

* Dracula’s Cabaret has an entry fee.
* Entry fee tickets are of different types (Regular and VIP).
* Price of the ticket varies based on its type.

CQs:

* What type of tickets are available for a certain show?
* What are the prices of different types of tickets for a certain show?

1. The fee to enter the Drax4Kids show is $32AUD per person.

* Drax4kids show has an entry fee.

CQs:

* Which show has an entry fee?

1. There are organized tours to see the sights of Melbourne and surrounding regions which include the great ocean road and the Yarra valley wineries.

* Tours are organized to see the sights of Melbourne and its surrounding regions.
* The Great Ocean Road and the Yarra Valley wineries are located near Melbourne.
* There are organised tours to see the Great Ocean Road.
* There are organized tours to see the Yarra Valley wineries.

CQs:

* In what city are tours organized for sight-seeing?
* What are the surrounding regions of a certain city?

1. Perth has winery tours at Margret river, along with the Scitech Discovery Museum in the city and tours at the Fremantle prison.

* Perth has winery tours.
* Perth has a museum, Scitech Discovery Museum.
* Scitech Discovery museum can be toured.
* Perth has a prison, Fremantle prison
* Fremantle prison can be toured.

CQs:

* What city has winery tours?
* What city has tours to a certain museum?
* What city has tours to a certain prison?
* What are the tours that can be organized in a certain city?

1. While in Melbourne, a visitor should take the opportunity to visit one of the many events such as theatre, opera performances and concerts which take place there during different time periods.

* Many events take place during different time periods in Melbourne.
* Theatre is an event.
* Opera performance is an event.
* Concert is an event.

CQs:

* What are the events that can be attended by visitors in a certain city?
* What are the different time periods that events happen in a certain city?
* Which city hosts multiple events during different time periods?

1. Travel guides are available for Perth, Melbourne, Canberra or Brisbane in several formats such as a guidebook or on a CD.

* Travel guides are available for different cities.
* Perth has a travel guide.
* Melbourne has a travel guide.
* Canberra has a travel guide.
* Brisbane has a travel guide.
* Travel guides have several formats.
* Travel guide can be a guidebook.
* Travel guide can be on a CD.

CQs:

* What are available for visitors to tour different cities?
* Which cities have travel guides?
* In what format are the travel guides available to help the visitors?

1. Maps of cities can be found in paper format or in an electronic format.

* Maps can be in paper.
* Maps can be electronic.

CQs:

* What are the formats in which maps to a city can be found?