MONASH University Information Technology	FIT9132 Database Technology Semester 2, 2015

Assignment 1

Due date: Friday, 28th August.
Place: Moodle submission page.
Assignment Weighting: 10%

In this assignment you will use the case “International programme for preservation of threatened species” described in Appendix A.

You are to complete the following tasks, related to data definition and data manipulation:

Task 1: Data Definition **(30 marks)**

Source Files:

- **conserv_create.sql**
- **conserv_drop.sql**

For this task, you will have to do the following:

i. Identify the entities and the foreign key constraints that are missing from the script conserv_create.sql.
ii. Add the missing CREATE TABLE and CONSTRAINTS definitions in the conserv_create.sql script. Please make sure you use the entity names used in the Logical Model diagram (page 9) to name the tables.
iii. Add the missing DROP TABLE statements to the conserv_drop.sql script.
iv. Execute your conserv_create.sql script. Use your conserv_drop.sql script to drop tables when necessary.
v. When you are happy with the results of the run of both files, save the output of the execution of the conserv_create.sql script into a file called conserv_out1.txt

Your conserv_create.sql script file must be executed successfully in the Oracle database before you attempt Task 2.

Task 2: Data Manipulation **(5 + 35 + 30 = 70 marks)**

a. Source Files:
   - **conserv_insert.sql**
   - **conserv_sequence.sql**

   Run the conserv_insert.sql script to add data into the tables created in task 1.

   An Oracle sequence is going to be implemented in the database for the subsequent insertion of records into the database for the tables ANIMAL, BREEDING_EVENT and EXCHANGE.

   For this task, you will have to do the following:

   Provide the CREATE SEQUENCE statements for the ANIMAL, BREEDING_EVENT and EXCHANGE tables. The sequence will be used to generate new primary key values when adding new tuples to these tables.
   - The sequence in the ANIMAL table should start from 31 and increment by 1.
   - The sequence in the BREEDING_EVENT table should start from 11 and increment by 1.
   - The sequence in the EXCHANGE table should start from 11 and increment by 1.

   You should include the statement/s to create the sequences in the conserv_sequence.sql script file provided to you. This script file should then be executed successfully in the Oracle database before you attempt Task 2(b).

Sequences must now be used to insert data into the database for the following sub-tasks (b and c).

b. Source Files:
   - **conserve_transfer.sql**
   - **conserv_breed.sql**
   - **conserv_offspring.sql**
   - **conserv_transfer2.sql**
   - **conserv_redlist.sql**

   Consider the following scenarios:

   1. A coordinated breeding program for Panthera Leo between Werribee Open Range Zoo and Kruger National Park has been setup. Kruger National park agrees to lend a male Panthera Leo (animal ID=16) to the Werribee Open Range Zoo. The transfer date has been setup as 03-March-2014. (Write your answer in the file conserv_transfer.sql)

2. The male Panthera Leo will be matched with the female Pathera Leo with animal ID = 9. Assume the breeding event will start on 01-August-2014. (Write your answer in the file conserv_breed.sql)
3. Assume the breeding event has been successful and 5 offspring (3 females and 2 males) have been born on 01-Feb-2015. The details of the newborn animals now need to be entered into the database. (Write your answer in the file conserv_offspring.sql)
4. The male Panthera Leo (the father) is transferred back to Kruger National Park on 15-Feb-2015. (Write your answer in the file conserv_transfer2.sql)
5. The red_list category for Hippopotamus amphibius has been changed from vulnerable to endangered. (You need to use conserv_redlist.sql)

For each of the above scenarios:

i. Write an SQL script that contains the necessary SQL statements to implement each scenario. You need to write a different SQL script for each of the scenarios. In the SQL statements, you need to make sure:
   - you use the sequences created in task 2a where it is appropriate.
   - you should not do a manual lookup for any id or code when the query provides a description. For example, you can't check the centre id for Kruger National Park from the printed version of the conserv_insert.sql. Consider the use of a subquery to find the centre_id from the CENTRE table knowing the name of the park.

ii. Execute the scripts and save the output to text files.

c. Source File: **conserve_dead.sql**

The International programme for preservation of threatened species would like you to consider the management of data related to animals in the database that are no longer alive. They are currently considering the removal of the details for any animal which dies.

For this task, you are required to do the following:

1. Consider the request to remove the dead animals data from the database, evaluate whether this request is desirable based on the current data model and database structure. Write, in no more than 2 pages, your opinion on this request. In the discussion, clearly explain the reasons for your suggestion. If you suggest, deletion of all data related to the dead animals is not desirable, suggest an alternative way to handle the information about the dead animals. Note: suggesting changes need to be made to the database structure is acceptable.
2. Write a script containing the SQL statements to implement your suggestion/s.

Submission Requirements:

The following files are required to be submitted as part of assignment 1:

- Completed **conserv_create.sql**
- Completed **conserv_drop.sql.**
- Completed **conserv_sequence.sql**
- Completed **conserv_transfer.sql**
- Completed **conserv_breed.sql**
- Completed **conserv_offspring.sql**
- Completed **conserv_transfer2.sql**
- Completed **conserv_redlist.sql**
- Completed **conserv_dead.sql**
- A file **conserv_suggestion.pdf** containing the explanation/suggestion on the handling of data pertaining to the dead animals in the database.
- **conserv_out1.txt (for task 1 output)**
- **conserv_out2a.txt (for task 2a output)**
- **conserv_out2b.txt (for task 2b output)**
- **conserv_out2c.txt (for task 2c output)**

You must submit a single zip file in Moodle named a1-<yourauthcateid>.zip e.g., a1-xyz123.zip containing the above-mentioned files before the assignment due date.

HURDLE requirement:

You will be asked to demonstrate the working of your scripts in week 7.

ON CAMPUS students:
The demonstration will be organised during tutorial class and possibly outside the class time.

You need to attend the scheduled session, the final mark for this assignment can only be released after you have completed the demonstration.

OFF CAMPUS students:
Your tutor will contact you with further instruction on how to setup the appointment for the demonstration.

Late Penalty:

Any submission after the due date will receive a deduction of 5 marks per day, which includes weekends.

Appendix A
International programme for preservation of threatened species

As natural habitats disappear, it is increasingly difficult to ensure that all species can survive in the wild. One solution is to use zoos, reserves and other types of organizations that keep wild animals in captivity as conservation centres for threatened species.

To turn the keeping of animals into a preservation programme, it is necessary for centres to collaborate with each other and to coordinate their activities. This requires that they share records about animals, as well as carefully documenting exchanges and breeding. A database model has been prepared to assist this process. The following material provides background information describing the various components of the model.

Biological classification is a hierarchical structure, which moves from the highest (most general) level of domain down to species (the most specific level). The lowest three levels are family, genus and species.

Threatened Species

Organizations dealing with threatened species often need to check essential information about the animals. The most fundamental information is the name of the species, as well as its popular name and the genus and family to which the species belongs. The relevant details for the Tasmanian Devil, for instance, are as follows ...

Popular name:	**Tasmanian Devil**
Family:	**DASYURIDAE**
Genus:	***Sarcophilus***
Species:	***harrisii***

It is also important to know the species' natural range, which is usually given as a description of the geographic regions and natural habitats where a species is found in the wild.

The breeding and exchange programmes are chiefly concerned with animals whose existence in the wild is threatened, usually because they are rare or endangered in some way. This information is captured by a species' ***conservation status***. The chief international source for this information is the ***Redlist***, which is maintained by

the International Union for Conservation of Nature (IUCN). The Redlist categorizes species using the codes listed in the table below.

Code	***Category***
LC	Least concern
NT	Near threatened
VU	Vulnerable
EN	Endangered
CR	Critically Endangered
EW	Extinct in the wild
EX	Extinct

The Tasmanian Devil, for instance, is classified as Endangered, coded "EN". For a species the model needs to record this Redlist status. In addition to this Redlist status the URL for the full details for a species must also be recorded. For example, the full details for the Tasmanian Devil are recorded at http://www.iucnredlist.org/apps/redlist/details/40540/0.

Animals

For particular animals it is important to know which centre they are currently located at, their species name and the sex of the animal.

Centres

In most countries there is at least one zoo, reserve or other centre that hosts threatened species. There are several different types of centre where endangered animals are kept, including zoos, wildlife parks, sanctuaries and nature reserves. Centres need to contact each other, as do agencies, governments and the general public. Essential data includes the director's name, as well as the phone number and address.

Conservation agencies

Conservation agencies in this context are bodies that coordinate, promote or manage conservation activities. Centres need to contact agencies on a regular basis, and need to have full contact details, including the director's name, as well as their phone number and address. Two main types of agency need to be considered:

National agencies are based within a particular country and usually report directly to the government ministry responsible for conservation policy. They include authorities (e.g. Environment Australia) and usually manage various conservation programmes, as well as overseeing important conservation activities (e.g. national parks).

International agencies are bodies that are active in many countries. Formal association with particular countries is normally via a treaty, signed by the agency director and the relevant Minister in countries that are signatories to the agreement.

Funding sources

Conservation programmes depend on funds. Conservation agencies provide grants to centres.

There are several types of grants. One-off grants help centres build new facilities, purchase new equipment, cover the costs of exchanges, or to capture new animals from the wild. Annual grants help with the routine costs of running preservation programmes, such as salaries, and routine maintenance costs.

Exchange programmes

Animals are regularly exchanged between centres. Zoos, for example, often send offspring of successful breeding to other zoos or reserves. The practice allows other centres to raise public awareness by displaying the animals. It also reduces the risk of losing entire groups of animals should disease or other misfortune hit a centre. Most centres participate in exchanges at some time or other.

Exchanges occur by transfer of an animal from one centre to another. There are four main reasons for transfers: loans, medical treatment, breeding and permanent transfers. Sometimes animals are exchanged several times, e.g. for breeding purposes. Details of exchanges need to be recorded as part of an animal's life history.

Breeding programmes

Some species of animals are now so rare in the wild that that their continued existence depends on cooperative breeding programmes involving zoos and wildlife reserves around the world. Centres need to keep careful track of breeding events. For each breeding event it is essential to know when and where (i.e. the centre) it took place, as well as the female and male involved. Any offspring that result are normally kept at the zoo where breeding takes place, but may later be transferred permanently elsewhere. The centre needs to be able to identify which breeding event produced which offspring. Animals captured from the wild will have no breeding event details available. The following is the 'typical' data recorded for two animals exchanges:

ANIMAL EXCHANGE HISTORY EXAMPLE 1

Animal ID;			6108432				
Common Name			Tasmanian Devil				
Genus			*Sarcophilus*				
Species			*harrisii*				
Sex			Female				
From Reserve			To Reserve			Date of Exchange	Type of Exchange
ID	Name	Type	ID	Name	Type		
AUS097	Queenstown Sanctuary	Reserve	SA001	Johannesburg Zoo	Zoo	18/07/2013	Permanent

ANIMAL EXCHANGE HISTORY EXAMPLE 2

Animal ID;			2700432				
Common Name			Black Rhinoceros				
Genus			*Diceros*				
Species			*bicornis*				
Sex			Male				
From Reserve			To Reserve			Date of Exchange	Type of Exchange
ID	Name	Type	ID	Name	Type		
SA118	Queenstown Sanctuary	Zoo	SA001	Johannesburg Zoo	Zoo	27/03/2013	Breeding
SA001	Johannesburg Zoo	Zoo	SA118	Queenstown Sanctuary	Zoo	13/08/2013	Breeding

A proposed **LOGICAL MODEL** is shown below:

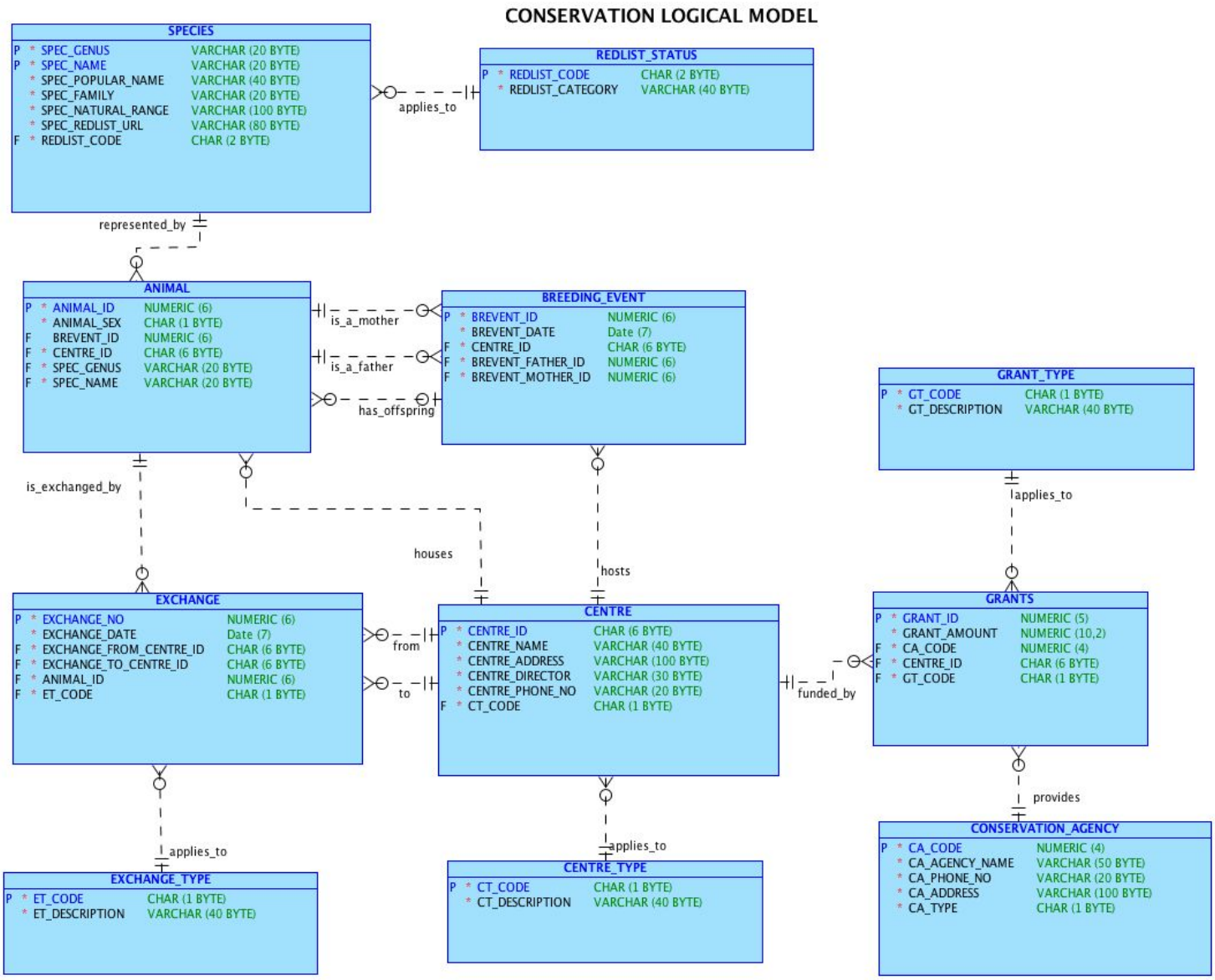

Table Details:

REDLIST_STATUS
Records the REDLIST status codes

REDLIST_Code IS 'REDList code from http://www.iucnredlist.org/ for species';
REDLIST_Category IS 'Description of redlist code';

SPECIES
Records details about a species

Spec_Genus IS 'Species genus';
Spec_Name IS 'Name of species';
Spec_Popular_Name IS 'Species popular name';
Spec_Family IS 'species family';
Spec_Natural_range IS 'Description of natural range of species';
Spec_REDLIST_URL IS 'URL from http://www.iucnredlist.org/ representing this species';
REDLIST_Code IS 'REDList code from http://www.iucnredlist.org/ for species';

ANIMAL
Records animal details - some animals are caught from the wild and are thus not offspring of a breeding_event, so event_id must be able to be empty

Animal_ID IS 'Unique ID for this animal ';
Animal_Sex IS 'Sex of animal (MUST BE: M or F)';
BrEvent_ID IS 'Breeding event under which this animal was born (if born within the system)';
Centre_ID IS 'ID of the centre where animal is currently held';
Spec_Genus IS 'Species genus';
Spec_Name IS 'Species name of animal';

EXCHANGE
Records details of animal exchanges between centres

Exchange_no IS 'Unique identifier for animal exchange';
Exchange_date IS 'Date of exchange (no time recorded, only day, month, year)';
Exchange_From_Centre_ID IS 'ID of centre where the animal comes from';
Exchange_To_Centre_ID IS 'ID of destination centre for exchange (centre going to)';
Animal_ID IS 'ID of animal involved in exchange';
ET_Code IS 'Exchange type code';

EXCHANGE_TYPE
Records the type of exchange eg. loan, medical treatment, breeding or permanent (transfer)

ET_Code IS 'Exchange type code';
ET_Description IS 'Exchange type description';

CENTRE
Records centre details eg. zoo, wildlife park, sanctuary, nature reserve etc

Centre_ID IS 'Unique identifier for Centre';
Centre_name IS 'Name of Centre';
Centre_Address IS 'Centre address';
Centre_Director IS 'Name of director of centre';
Centre_phone_no IS 'Centre phone contact number';
CT_Code IS 'Centre type code';

CENTRE_TYPE
Records type of centre

CT_Code IS 'Centre type code';
CT_Description IS 'Centre type description';

BREEDING_EVENT
Records a breeding event

BrEvent_ID IS 'Unique identifier for breeding event';
BrEvent_Date IS 'Date breeding event took place';
Centre_ID IS 'ID of centre where breeding event took place';
BrEvent_Father_ID IS 'Animal ID of father in breeding event';
BrEvent_Mother_ID IS 'Animal ID of mother in breeding event';

GRANTS
Records grants made available to centres

Grant_ID IS 'Unique identifier for grant';
Grant_Amount IS 'Amount $"s of grant';
CA_Code IS 'Conservation agency code which made grant';
Centre_ID IS 'ID of centre receiving grant';
GT_Code IS 'Grant type code';

GRANT_TYPE
Records types of grants

GT_Code IS 'Grant type code';
GT_Description IS 'Grant type description';

CONSERVATION_AGENCY
Records funding agency details

CA_Code IS 'Unique identifier for Conservation Agency';
CA_Agency_name IS 'Conservation Agency name';
CA_Phone_no IS 'Conservation Agency contact phone number';
CA_Address IS 'Conservation Agency address';
CA_Type IS 'Conservation Agency type National or International - MUST BE: N or I';