



Assignment 1

SCS Resource Management Database Design Project- Requirement Analysis and Conceptual Design

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| COMP1140: Database and Information Management. | Due: 11:59 pm, Sunday, August 30, 2020 WORTH 15% of the final assessment mark. |

PART 1: Requirements

# Data Requirements

The School of Computer Science (SCS) Resource Management project are to managing and lends resources to the staff and students for their use relating to their work and study purpose at the university. The resources can include cameras, earphones, mouse, lab top, study room, lab room, etc.

**Resources**

SCS Resource Management has managed the resources into two different type, which are movable and immovable type. The additional data of each resource is held as movable or immovable.

All resources are allocated its own location and resources can be assigned to a category.

1. The data describing a resource includes a unique resource id, description, present status (In Use, Maintenance, Available, Borrowed, Lost, Damaged), location id(where the resource is been stored), category code which can indicate the category of the resource assigned.
2. The date describing a movable type resource includes the id of the resource, name, make, manufacturer, model, year, asset value (the value of the resource) and max borrowing time.
3. The data describing an immovable type resource includes the id of the resource, name of the immovable resource, capacity(how many student can be in a room) and max borrowing time(how long can the room be held at one time).

**Location**

All resources have a location where they are located. These locations have its unique id, a room (the name of the room that the resource is stored), building (the building name of the room where it is located) and campus (the campus that the room is located).

SCS Resource Management are store additional information about where the resources are located as the owner of the resources SCS still want to keep monitor the resource items.

**Category**

The resource can be assigned into a category. The data stored for each category includes a unique category code, name(the name of the category which the resource is assigned to ), description of the category and max Time borrow or book( the maximum borrowing time of the category can be held by a member on one time. )

The idea of the category in SCS Resource Management is to gather those specific resources for its relating courses which can allow students to borrow by their granted privileges. Each category can contain a maximum of 10 resources at any one category.

**Members**

Staff and students (students who enrol in courses offered) are the two main types of members in the School of SCS. Members can make reservations for resources and loan movable resources base on their privileges. Each member can also make acquisition requests.

The data stored regarding each member includes a unique member id, name, address (street, city, and postcode),phone, email, status(member’s privileges status),comments field(notes or additional information related to the member).

**Staff**

Staff member can borrow, or reserve resources unlimited.

The data stored regarding to each staff member contains a unique member id and number items (the number of resources is borrowed to the staff member).

The number items keep track on how many resources are currently using by staff member, a staff member can hold up to a maximum of 100 resources at any one time.

**Student**

Student members are granted privileges to borrow specific resources base on the course they are enrolled in.

The data stored regarding to each student member contains a unique member id and offering id (the course offering id for the student), points (each student have initial 12 points earned).

The points of the student member are related to their resources borrowing privileges in School of SCS. Student member will be reward 1 demerit point if the student has non cancellation of reservation for every 60 day during the semester. A penalty of 3 points is incurred for each overdue day if student is holding on an overdue resource. When the point is reduced to 0, member status is disabled, disallowing borrowing or reservation privileges.

The points can be reset or amend by the rights of the administrator.

**Course offering**

Student member of SCS are enrolled in courses offered by the school. Each course offering is contained the course’s information, including a course id which is granted privileges to borrow the category of resources.

The data stored regarding to each course offering includes a unique offering id, course id, name, semester offered(semester 1 or semester 2 ), year offered(which year is the course offered), date begins (when is the first date of school) and date ends(the last date of school).

**Privileges**

Each student has their own granted privileges base on the courses they are enrolled in.

The data stored for each privileges includes course id, name, description of the privileges, category code(which resource category is been assigned as a privileges for student to borrow) and max resources(the maximum number of resources are granted privileges allow student to borrow ).

To limit the use of the resources and maintain the resources’ far use for all member of the school, SCS Resource Management has designed each privilege can only allow to hold a maximum of 4 categories.

**Acquisition Request**

The school consistently updates its resources. Member can request new acquisition to SCS which will help the member access to newer and updated materials.

The data stored regarding to the acquisition request contains member id(member who is requesting the acquisition ),item name, make (which branch is the items made from), manufacturer(manufacturer of the requested item), model(item’s model), year(the year of the item’s model), description, urgency(urgent or normal ), admin note(any additional note can be add by the system administrator).

Once the acquisition request is made by the member, the administrator of the system assigns a status, a fund code, vendor code, price and any other notes pertaining to the request.

**reservations**

When a member wants to make a reservation for the resource, the reservation details will be store and displayed on the SCS Resources Management web site.

The data stored for each reservation contains the member id (the member who made the reservation), resource id (the reserved resource’s id), date time requested and date time due.

Requests for reservations are authorised on a first-come-first-serve basis. Once the member had made their reservation, the resource is reserved for the member on the requested date and time, the resource’s status will be in use. If the resource is not been picked up by reserved member a day after the required date, the reservation will be cancelled automatically, and the status of the resource will be available.

**loan**

A member can loan movable resources allowed by his/her privileges. When required, the loan details will be store and displayed on the SCS Resources Management web site.

The data stored for each loan reservation contains the member id (the member who is requested to loan the movable resource ),resource id, date time loaned, date time due(movable resource’s loan duration at any one time) and date returned( the date and time when the resource is returned).

Once the resource is loaned, the resource’s status will be in use until the movable resource is returned.

# Business rules

The business rules are to Organising resources to provide efficient access to them. So that the member can have a far opportunity to access the resources they need for their study.

Student has an initial of 12 points, a penalty of 3 points is incurred for each overdue day. Once the point is reduced to 0, the student member’s status is disabled, disallowing any borrowing and reservation privileges.

Students can only borrow or reserve resource within their privileges base on the course offering. Each student can have up to 4 courses offering, each course can only be granted 1 privilege and each privilege can have maximum of 5 category.

Each category can have a maximum of 10 resources.

The administrator has rights to reset or amend points.

If the student has non cancellation of reservation for a period of 60 days, the system will automatically reward 1 point back to the student member.

When a student’s enrolled course end date is later than the current date, the borrowing privileges are automatically taken away and the status of the student member is set to disabled.

Student must have at least one course offering.

Staff members have privileges access to all the resources in SCS.

A staff member can only borrow or reserve maximum 10 resources at one time. once all the items are returned, the staff member borrowing capacity is reset back to 10 items and they can continue to borrow and reserve new items.

A reserved item will be cancelled if it is not pick up a day after the required date.

The administrator holds the right to cancel any reservation.

If an item is reported damage or lost by the administrator, the member lending the resource must pay the fees of item’s original asset value.

A member can only make a maximum of 10 acquisition requests at a duration of 90 days during the study period.

A resource can either store as movable or immovable type of resource. A resource can only be stored in one location, but one location may contain multiple resources.

# Transaction requirement

**Data entry**

Enter the details of a new resource (such as resource id 1001, camera is located at room 409, ES building, SCS campus, status is available and resource camera is assigned to category 8).

Enter the details of a new category (such as category 8 has 48 hours maximum borrow time).

Enter the details of a member of student who has privilege to borrow the item camera (such as member id 3238888 Captain Cook has an offering id 1, Captain Cook has 12 points).

Enter the details of a course offering of a student (such as offering id 1, Captain Cook has been offered to a course Art2020, date ends 01/01/2050).

Enter the details of a privilege of course Art2020 (such as course Art2020 have privilege to borrow category 8 for 48 hours).

Enter the details of a loan between a student member and movable resources (such as member id 3238888 loaned resource id 1001 on 16:00:00 29/08/2020, item due on 16:00:00 31/08/2020, item returned on 12:00:00 31/08/2020)

Enter the details of another new resource (such as resource id 1002, reading room is located at room BBC01, library, SCS campus, status is available).

Enter the details of new immovable (resource id 1002, capacity of 200 person and has a 4 hours max borrowing time).

Enter the details of a member of staff (such as member id 2228888 Jacky Chen, 0 item is borrowed).

Enter the details of a reservations between a staff member and a resource (such as member id 2228888 is reserved resource id 1002 on 12:00:00 29/08/2020, the due time is 16:00:00 29/08/2020).

Enter the details of an acquisition request (such as member id 3238888 is requesting item apple earphone).

**Data update/deletion**

Update/delete the details of a resource.

Update/delete the details of a member of student’s offering and points.

Update/delete the details of the privilege related to the course.

Update/delete the details of a category.

Update/delete the details of a member of staff.

Update/delete the details of an acquisition request.

**Data queries**

Search a loaned item based on a member’s id number, on a date.

Find the student with a late returned item number.

Find member with its specific member id.

List all the student’s privilege status.

List all the reservations for a specific item.

Report of points earned for specific student during a time period.

List the resource stored locations.

List of the resource’s category provided by the school.

Identify the details of student’s privileges.

List of the course offering information.

Search course offering by its offered semester, year offered, date begins and date ends.

Identify the member that has reach their maximum borrowing items capacity.

List the name, address, phone, email, status, item borrowed of student.

List the name, address, phone, email, status and item reserved of staff.

Find the acquisition request by member id.

PART 2: EER Model with data dictionary

# EER model/diagram

EER model/ diagram is placed in the visio file in the zip folder.

# Data dictionary

**Entity types**

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| --- | --- | --- | --- |
| **Entity Name** | **Description** | **Aliases** | **Occurrence** |
| Movable | movable type of resource | Movable Resource’s information | When a movable resource’s information is entered |
| Immovable | immovable type of resource | Immovable Resource’s information | When an immovable resource’s information is entered. |
| resources | Information of resource | resources | When a resource exists. |
| locations | Information of the resource is stored | Resource’s location | When the resource existed. |
| category | Category of resources | resources | When resource is assigned to a category. |
| privileges | Privilege for student according to the course enrolled | Course enrolled | When a student enrolled into specific course. |
| Course offering | Describing course offering that student have been offered | Student enrolment | When a student member exists. |
| students | Information of student member | Member of the school | When a student of member exists. |
| staff | Information of staff member | Member of the school | When a staff of member exists. |
| members | Describing information of all type of members | Members | When a member of SCS exists. |
| reservations | Describing reservation that members have made | Resource reservation | When a reservation is made by a member |
| loan | Describing loans that members have made | Resource borrowed | When a loan is made by a member |
| Acquisition request | Describing Acquisition that member have request. | Request acquisition | When a request is made by a member |

**Relationship types**

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| --- | --- | --- | --- | --- |
| **Entity Name** | **Multiplicity** | **Relationship** | **Multiplicity** | **Entity Name** |
| resources | 1..1 | Has | 0..\* | movable |
| 1..1 | has | 0..\* | immovable |
| 0.\* | Has | 1..1 | location |
| 1..10 | Belongs to | 0..\* | category |
| category | 1..5 | Is assigned to | 1..\* | privileges |
| privileges | 1..1 | Base on | 1..1 | Course offering |
| Course offering | 1..4 | Is offered to | 0..\* | student |
| students | 0..\* | Is a | 1..1 | member |
| 0..\* | has | 1..4 | Course offering |
| staff | 0..\* | Is a | 1..1 | member |
| 0..\* | Can borrow | 0..10 | resources |
| members | 1..1 | Can make | 0..10 | Acquisition request |
| reservations | 0..10 | to | 1..1 | member |
| 1..1 | Is Of | 1..1 | resources |
| loan | 0..\* | Is of | 1..1 | movable |
| 0..\* | To | 1..1 | member |

**Attributes**

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Entity** | **Attributes** | **Description** | **Data type & length** | **Nulls** | **Multi-valued** | **Derived** | **default** |
| **movable** | **Resource id** | **Unique resource identifier** | **char(10)** | **N** | **N** | **N** |  |
| **Name** | **Name of the resource** | **Varchar(50)** | **N** | **N** | **N** |  |
| **Make** | **Make by** | **Varchar(50)** | **Y** | **N** | **N** |  |
| **Manufacturer** | **Manufacturer of the resource** | **Varchar(50)** | **Y** | **N** | **N** |  |
| **model** | **Model of the resource** | **Char(10)** | **Y** | **N** | **N** |  |
| **year** | **Year of the resource** | **int(4)** | **Y** | **N** | **N** |  |
| **Asset value** | **Resource value** | **Decimal(5,2)** | **Y** | **N** | **N** |  |
| **Max borrowing time** | **Maximum borrowing duration** | **datetime** | **N** | **N** | **N** |  |

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| **Entity** | **Attributes** | **Description** | **Data type & length** | **Nulls** | **Multi-valued** | **Derived** | **default** |
| **immovable** | **Resource id** | **Unique resource identifier** | **char(10)** | **N** | **N** | **N** |  |
| **Name** | **Name of the resource** | **Varchar(50)** | **Y** | **N** | **N** |  |
| **capacity** | **Capacity of room** | **int** | **Y** | **N** | **N** |  |
| **Max borrowing time** | **Maximum borrowing duration** | **datetime** | **N** | **N** | **N** |  |

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| **Entity** | **Attributes** | **Description** | **Data type & length** | **Nulls** | **Multi-valued** | **Derived** | **default** |
| **resources** | **Resource id** | **Unique resource identifier** | **char(10)** | **N** | **N** | **N** |  |
| **description** | **description of the resource** | **Varchar(50)** | **Y** | **N** | **N** |  |
| **status** | **Status of resource** | **Varchar(50)** | **N** | **N** | **N** |  |
| **Location id** | **Location stored** | **char(10)** | **N** | **N** | **N** |  |
| **Category code** | **Assign to a category** | **Char(10)** | **Y** | **N** | **N** |  |

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| **Entity** | **Attributes** | **Description** | **Data type & length** | **Nulls** | **Multi-valued** | **Derived** | **default** |
| **Category** | **Category code** | **Unique category identifier** | **char(10)** | **N** | **N** | **N** |  |
| **Name** | **Name of the category** | **Varchar(50)** | **y** | **N** | **N** |  |
| **description** | **description of the category** | **Varchar(50)** | **Y** | **N** | **N** |  |
| **Max borrowing time** | **Maximum borrowing duration** | **datetime** | **N** | **N** | **N** |  |

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| **Entity** | **Attributes** | **Description** | **Data type & length** | **Nulls** | **Multi-valued** | **Derived** | **default** |
| **privileges** | **Course id** | **Unique course identifier** | **char(10)** | **N** | **N** | **N** |  |
| **Name** | **Name of the category** | **Varchar(50)** | **y** | **N** | **N** |  |
| **description** | **description of the category** | **Varchar(50)** | **Y** | **N** | **N** |  |
| **Category code** | **Unique category identifier** | **Char(10)** | **N** | **N** | **N** |  |
| **Max borrowing time** | **Maximum borrowing duration** | **datetime** | **N** | **N** | **N** |  |

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| **Entity** | **Attributes** | **Description** | **Data type & length** | **Nulls** | **Multi-valued** | **Derived** | **default** |
| **Course offering** | **offering id** | **Unique offering identifier** | **char(10)** | **N** | **N** | **N** |  |
| **Course id** | **Unique course identifier** | **char(10)** | **N** | **N** | **N** |  |
| **name** | **Name of the offer** | **Varchar(50)** | **Y** | **N** | **N** |  |
| **Semester offered** | **Which semester is been offered** | **Varchar(50)** | **Y** | **N** | **N** |  |
| **Year offered** | **Which year is offered** | **Int(4)** | **Y** | **N** | **N** |  |
| **Date begins** | **Begin date of the offer** | **datetime** | **Y** | **N** | **N** |  |
| **Date ends** | **End date of the offer** | **Datetime** | **Y** | **N** | **N** |  |

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| **Entity** | **Attributes** | **Description** | **Data type & length** | **Nulls** | **Multi-valued** | **Derived** | **default** |
| **Student** | **Member id** | **Unique course identifier** | **char(10)** | **N** | **N** | **N** |  |
| **Offering id** | **Name of the category** | **char(50)** | **N** | **N** | **N** |  |
| **point** | **description of the category** | **Int(2)** | **N** | **N** | **N** | **12** |

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| **Entity** | **Attributes** | **Description** | **Data type & length** | **Nulls** | **Multi-valued** | **Derived** | **default** |
| **staff** | **Member id** | **Unique member identifier** | **char(10)** | **N** | **N** | **N** |  |
| **Number items** | **Number of item held** | **Int(2)** | **N** | **N** | **N** | **0** |

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| **Entity** | **Attributes** | **Description** | **Data type & length** | **Nulls** | **Multi-valued** | **Derived** | **default** |
| **Acquisition request** | **member id** | **Unique member**  **identifier** | **char(10)** | **N** | **N** | **N** |  |
| **Item Name** | **Name of the item** | **Varchar(50)** | **N** | **N** | **N** |  |
| **Make** | **Make by** | **Varchar(50)** | **Y** | **N** | **N** |  |
| **Manufacturer** | **Manufacturer of the resource** | **Varchar(50)** | **Y** | **N** | **N** |  |
| **model** | **Model of the resource** | **Char(10)** | **Y** | **N** | **N** |  |
| **year** | **Year of the resource** | **int(4)** | **Y** | **N** | **N** |  |
| **description** | **Description of the acquisition request** | **Decimal(5,2)** | **Y** | **N** | **N** |  |
| **urgency** | **Request urgency** | **datetime** | **N** | **N** | **N** |  |
| **Admin note** | **Note for the request** | **Varchar(50)** | **Y** | **N** | **N** |  |

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| **Entity** | **Attributes** | **Description** | **Data type & length** | **Nulls** | **Multi-valued** | **Derived** | **default** |
| **members** | **member id** | **Unique offering identifier** | **char(10)** | **N** | **N** | **N** |  |
| **name** | **Name of the member** | **Varchar(50)** | **N** | **N** | **N** |  |
| **address** | **Which semester is been offered** | **Varchar(50)** | **Y** | **N** | **N** |  |
| **phone** | **Which year is offered** | **char(10)** | **Y** | **N** | **N** |  |
| **email** | **Begin date of the offer** | **Varchar(50)** | **Y** | **N** | **N** |  |
| **status** | **End date of the offer** | **Datetime** | **N** | **N** | **N** |  |
| **Comments field** | **Comments on member** | **Varchar(50)** | **Y** | **N** | **N** |  |

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| **Entity** | **Attributes** | **Description** | **Data type & length** | **Nulls** | **Multi-valued** | **Derived** | **default** |
| **reservations** | **member id** | **Unique offering identifier** | **char(10)** | **N** | **N** | **N** |  |
| **Resource id** | **Name of the member** | **char(10)** | **N** | **N** | **N** |  |
| **Date time requested** | **Which semester is been offered** | **Datetime** | **N** | **N** | **N** |  |
| **Date time due** | **Which year is offered** | **Datetime** | **Y** | **N** | **N** |  |

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| **Entity** | **Attributes** | **Description** | **Data type & length** | **Nulls** | **Multi-valued** | **Derived** | **default** |
| **loan** | **member id** | **Unique offering identifier** | **char(10)** | **N** | **N** | **N** |  |
| **Resource id** | **Name of the member** | **char(10)** | **N** | **N** | **N** |  |
| **Date time loaned** | **Which semester is been offered** | **Datetime** | **N** | **N** | **N** |  |
| **Date time due** | **Which year is offered** | **Datetime** | **N** | **N** | **N** |  |
|  | **Date time returned** | **When the item is returned** | **Datetime** | **Y** | **N** | **N** |  |

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| **Entity** | **Attributes** | **Description** | **Data type & length** | **Nulls** | **Multi-valued** | **Derived** | **default** |
| **locations** | **location id** | **Unique location**  **identifier** | **char(10)** | **N** | **N** | **N** |  |
| **room** | **The room number** | **char(10)** | **Y** | **N** | **N** |  |
| **building** | **The building name** | **Char(10)** | **Y** | **N** | **N** |  |
| **campus** | **The campus’ name** | **Varchar(50)** | **Y** | **N** | **N** |  |