1. Mini-World Description

The mini world I chose for this project is SKI\_FIELD. The SKI\_FIELD database will keep track of the customers, staff, rentals, lessons, and lift passes. Below I have described the different parts of the SKI\_FIELD we have chosen to model.

* The details of every customer are stored including their name, DOB, email, and phone. Every customer requires a unique lift pass in order to be a customer of the ski field. If customers require, they can rent equipment for a specific period before they are required to return it before the stored date. Customers can sign up to lessons if they wish, what lessons a customer signs up to is kept track of.
* The lift pass is an identifier for the staff and customers. Different pass types are allocated depending on how long the user wants it for. Every time the pass is scanned it will check if it is still valid based on the start date and time period.
* Staff teach lessons which are available to all customers. Customers are able to enroll into multiple lessons. The level, lesson type and sport help customers to know what lesson to sign up for and what staff member to allocate to the lesson.
* Each piece of rental equipment has a unique ID. A customer can rent multiple pieces of equipment at a time, and this transaction needs to be facilitated by a staff member.
* Keep the information of each staff name, date of birth, job type, start date, sex, IRD number, and salary. A staff can work as an instructor and/or handle rental transactions. It is possible for a staff to be an instructor for multiple lessons. The staffs get paid by the number of hours spent working every week

1. Entities and Attributes

* LESSONS
  + Level: simple, single-valued, string (e.g. “Beginner”)
  + Lesson\_type: simple, single-valued string (e.g. “Private”)
  + Sport: simple, single-valued, string (e.g. “Snowboard”)
  + Date\_time: simple, single-valued, datetime
  + Time\_period: simple, single-valued. time
  + Price: simple, single-valued, real
  + Lesson\_number: simple, single-valued, integer key attribute
* LIFT\_PASS
  + Pass\_type: simple, single-valued, string (e.g. “Season Pass”)
  + Start\_date: simple, single-valued, date
  + Time\_period: simple, single-valued, time
  + Valid: simple, single-valued, boolean
  + Pass\_number: simple, single-valued, integer key attribute
* CUSTOMER
  + Name: composite (FName, LName), single-valued, string weak key attribute
  + Date\_of\_birth: simple, single-valued, date
  + Age: simple & derived, single-valued, integer
  + Email: simple, single-valued, string
  + Phone: simple, single-valued, string
* RENTAL\_TRANSACTION
  + Date\_time: simple, single-valued, datetime key attribute
  + Rental\_length: simple, single-valued, time
  + Total\_price: simple & derived, single-valued, real
  + Equipment\_code: simple, multi-valued, string key attribute
* RENTAL\_EQUIPMENT
  + Rental\_code: simple, single-valued, string key attribute
  + Type: simple, single-valued, string (e.g. “Ski Boot”)
  + Price: simple, single-valued, real
  + Size: simple, single-valued, integer
* STAFF
  + Name: composite (FName, LName), single-valued, string
  + Date\_of\_birth: simple, single-valued, date
  + Job\_type: simple, multivalued, string (“Instructor”, “Rentals”)
  + Start\_date: simple, single-valued, date
  + Sex: simple, single-valued, char (“M”, “F”)
  + IRD\_number: simple, single-valued, int key attribute
  + Salary: simple, single-valued, real

1. Relationships

* ENROLLED\_IN
  + M:N relationship
  + One customer can have many lessons, and each lesson can have several customers assigned to it.
  + CUSTOMER is partial participation; LESSON is total participation.
* LINKS\_TO
  + 1:1 relationship
  + Each customer can only have one lift pass, and each lift pass can only be used by one customer.
  + CUSTOMER is total participation; LIFT\_PASS is total participation. (A CUSTOMER is not CUSTOMER without a LIFT\_PASS because they cannot use the ski field)
* ACCESS\_TO
  + 1:1 relationship
  + Each staff member can only have one lift pass, and each lift pass can only be used by that one staff member.
  + STAFF is partial participation; LIFT\_PASS is partial participation. (Staff do not need to have a pass to be staff, pass does not need staff to exist.)
* RENT\_TO
  + 1:N relationship
  + Each customer/staff can have multiple rental transactions, each rental transaction is with one customer or staff.
  + CUSTOMER and STAFF are partial participation; RENTAL\_TRANSACTION is total participation with both CUSTOMER and STAFF. (RENTAL TRANACTION only exists if CUSTOMERS rent but they do not have to rent)
* RENTED\_IN
  + M:N relationship
  + A rental transaction can include multiple pieces of equipment, and each piece of equipment can be rented multiple times over time.
  + RENTAL\_TRANSACTION is total participation; RENTAL\_EQUIPMENT is partial participation.
* TEACHES
  + 1: N relationship
  + A lesson can have 1 instructor, but in instructor can teach multiple lessons.
  + STAFF is partial participation; LESSON is total participation.

1. ER-diagram

