

## Assignment 4

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### Problem 1(a)

I built Meet, University, Organization, Team, Swimmer, Event, Distance, Stroke, Heat entity in my ER diagram.

Each Meet is hosted by either university or organization. So, university and organization disjoint union host. Meet has a relationship of host with host.

Many teams from university participate the meet. So, meet and team has a relationship of participation. Team has a relationship of representation with university. Team's Id is a weak entity so it need university's primary key to define itself. Team from university has many swimmers, swimmer's id is also weak entity which need primary key from Team.

Event has attributes of distance and stroke. Because distance and stroke must be standard, so I built distance and stroke entity, distance is distance of event and stroke is the stroke of event. I use binary relationships to build event, distance and stroke's n-ary relationship.

Event has many heats, so heat and event has a relationship of has, heat has a weak entity of heat id, because it needs event id and its own heat id to define itself.

If user want to track results, so swimmer and heat has a relationship of participation. This relationship has a result attribute. This would record each swimmer's result at a specific event and heat.

### Problem 1(b)

In this ER diagram, I use race to inherit from relay and event, use competitor to inherit from swimmer and group.

Because relay races consist of four equal-length segments, each segment is the same or from 4 standard stroke. So I build relay entity, it has n-ary relationship with stroke and segment. I built distance and relay as binary relationship because each segment's distance is the same.

Race is a subclass of relay and event, race is either relay or event. So heat has a weak entity of heat id, which needs race id to define itself.

For relay race, there's several groups each has several members. So I build group entity to compete at relay races.

Swimmer and group are the union of competitor. So competitor is either a swimmer to attend event or group to attend relay races.

Competitor and Heat has a relationship of participation, participation has a time attribute to record result.

Because we need built relationship between group member and heat to record each group member's time. So I build group member as an entity rather than relationship to represent binary relationship between group and swimmer.

I build another relationship of participate between group member which contains group id and swimmer id and heat which contains race id and heat to record everyone's time. This relationship also has time and segment attribute.

## Problem 2

I built person, musician, actor, writer, lyricist, group, family, song, recording, collection, video, genre as entity.

Musician, actor, writer, lyricist are subclasses of person, a person can be both musician and actor so it's not disjoint union.

Musician and group are subclasses of performer. Group consists of musicians so group has a relationship of consists of with musician. Performer can publish music, either by one musician or group, even by multiple musicians so it's not disjoint union.

Musician has a family member relationship with family entity.

Recording and collection are disjoint union of music. Because performer can publish either recording or collection.

A song has multiple recordings, so I establish a relationship of has between them. A song and writer, lyricist are n-ary relationship, so I use binary relationship to represent it by writer entity is writer of a song and lyricist entity is a lyricist of a song.

Collection consists of multiple recordings so I make a relationship between them. Each song has many genres, so I build genre entity which is a genre of relationship with song. Musician, recording and instrument is many to many relationship, so I built a n-ary relationship between recording and musician, this relationship has a weak entity of instrument which need musician and recording to define it.

Video has a relationship with actor who perform the video and with producer who produce the video. Actor and producer are subclasses of person.

### Problem 3

- (1) Yes, it's possible to have a series of weak entity sets. WeakA's primary key is the union set of all the weak sets' weak entity and the non-weak entity set's primary key.
- (2) No, because it's endless, it needs a final non-weak entity.
- (3) No, because it's endless.