INF-2700 Exercise 3

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The focus of this week is Assignment 1, PART III (if not too late) as well as preparation of Assignment 2.

You can find the toy C programs in git `shared/example-dbs/food-db/`.

1 sqlite3 C

Walk through the `select.c` example for the usage of sqlite3 C API.

Make some changes and see how to handle different cases:

- use a non-existent table name in `select`.
- `*sql = "select name from food_types; select * from episodes;"` and use `tail`.

2 C input

Some students might not be familiar with C. This part will help those at beginner's level. (I use `scanf` as a simple way to parse input in assignments 2 and 3.)

This simple C program `input.c` is supposed to get *one line at a time*, or at least as a new beginner might think:

```
#include <stdio.h>
#include <string.h>

int main ( int argc, char* argv[])
{
  char str[200];

  while (strcmp(str,".quit") != 0)
    {
      scanf ("%s", str);
    }

  return (0);
}
```

A file `test-input.txt` that contains

```
select * from episodes;
.quit
```

- Run `gcc -g -o input input.c`
- Run `input < test-input.txt`

  - What is the value of `str`?
  - Use `printf ("%s\n", str);` to check.
  - `man scanf`

- Now use `fgets (str, 200, stdin)` instead.
  - Use `Ctrl-C` to stop.
  - Why does it not stop?
  - First use Use `printf ("%s\n", str);`
  - Then use `printf ("\"%s\"\n", str);` to check.
  - Run `gdb input`
    * `list`
    * `break 11` (line of `printf`)
    * `run < test-input.txt`
    * `print str`
  - Compare the use of `printf` and `gdb`.
  - Should we use `str[200]` or `str[201]`?
  - `man fgets`

3 SQL NULL

In relational algebra there is no `NULL`. SQL introduces `NULL`, which is practically useful. Using `NULL` needs some special care.

3.1 What are the results of the following SQL queries? Why?

```
SELECT *
FROM episodes
WHERE season = NULL;

SELECT *
FROM episodes
WHERE season != NULL;

SELECT *
FROM episodes
WHERE season is NULL;
```

3.2 $R \bowtie R = R$ (really?)

Try the following queries. Observe and explain the difference.

```
WITH e0 AS
(SELECT *
 FROM episodes
 WHERE season is NULL)
SELECT *
FROM e0 NATURAL JOIN e0;
```

```
WITH e0 AS
(SELECT *
 FROM episodes
 WHERE season is NULL)
SELECT *
FROM e0 AS e1, e0 AS e2
WHERE e1.id = e2.id;
```