**CMSC/CIS 255 Fall 2016**

**Normalization Exercise**

1. Show the dependency diagram for the following table (the PK is AC\_NUM). Then put the database into 3NF, showing the dependency diagram for each table, including primary and foreign keys.

| **Flights** | | | | | |
| --- | --- | --- | --- | --- | --- |
| **AC\_NUM** | **AC\_MODEL** | **AC\_MFG** | **AC\_RENT\_CHG** | **AC\_SEATS** | **AC\_TOT\_TIME** |
| 178RI | C-172 | Cessna | $58.50 | 4 | 4513 |
| 205IY | C-172 | Cessna | $58.50 | 4 | 5325 |
| 2087V | C-152 | Cessna | $51.75 | 2 | 4889 |
| 226BR | C-172 | Cessna | $58.50 | 4 | 4299 |
| 2867W | PA28-181 | Piper | $64.00 | 4 | 3267 |
| 3213R | PA28-181 | Piper | $64.00 | 4 | 2518 |
| 4112E | PA28-181 | Piper | $64.00 | 4 | 5211 |
| 45ZU | C-152 | Cessna | $51.75 | 2 | 7003 |
| 5725Y | C-172 | Cessna | $58.50 | 4 | 3968 |

1. A database table for books has the following columns: ISBN, Book\_Title, Author\_Num, Author\_Name, Publisher, Edition, and Royalty.

The ISBN provides information about the book (e.g. title, publisher, edition), while the Author\_Num provides information about the author (e.g. author-name). Authors are paid royalties for each edition of each book that they write for a publisher.

1. Draw a dependency diagram, identifying the PK and all dependencies.
2. Modify the dependency diagram so that it is in 3NF. Show all PKs and FKs.
3. A database table for prescriptions has the following columns: Prescription\_ID, Prescription\_Date, Medicine\_ID, Medicine\_Name, Patient\_ID, Patient\_Name, Dosage, Expiration\_Date, RefillsAllowed, ShelfLife. Each prescription is issued to a specific patient on a certain date. Each prescription specifies the dosage and the number of refills allowed. Each medicine has an expiration-date and a shelf-life.
4. Draw a dependency diagram, identifying the PK and all dependencies.
5. Modify the dependency diagram so that it is in 3NF. Show all PKs and FKs.
6. Determine whether Purchasing.ProductVendor is in 3NF.