**CMIS 320 Project 4**

Examine the following relation and its attributes and answer the following questions. Assume these are the values for "all time". Assume girls with the same name are the same person.

| GIRL | GROUP | AGE | GAME | CATEGORY | PRICE |
|---|---|---|---|---|---|
| Charlotte | 5 year olds | 5 | Mirror | Makeup | 4.88 |
| Susan | 6 year olds | 6 | Lipstick | Makeup | 5.95 |
| Jane | 5 year olds | 5 | Chess | Games | 7.55 |
| Susan | 6 year olds | 6 | Checkers | Games | 5.95 |
| Susan | 6 year olds | 6 | Mirror | Makeup | 4.88 |
| Carrie | 6 year olds | 6 | Lipstick | Makeup | 5.95 |
| Jacqueline | 5 year olds | 5 | Visual Basic | Prog. Languages | 199.99 |

1) Is this relation in at least 1NF? Why or why not?

2) What is the primary key of the initial relation (assume the values shown are the only possible tuples for all time)? Remember that a primary key must be unique and not null.

3) Describe the specific data anomalies that exist if we DELETE the tuple containing Jacqueline.

4) Draw a functional dependency diagram for the initial relation. This diagram should agree with the primary key you selected in above.

5) Based on your diagram, what normal form is the initial relation in? Why?

6) If necessary, decompose the initial relation into a set of non-loss 3NF relations by showing the relations, attributes, and tuples. Show complete relations with attribute headings and all data values in the tuples of your relations. Determine the number of 3NF relations you end up with after normalization, write this number, and then circle the number.

**Grading rubric**

| Attributes | Meets | Does Not Meet |
|---|---|---|
| Normal form | **20 points**<br>Student correctly identifies normal form of initial relation | **0 points**<br>Major error in identification of normal form or not specified |
| Primary key | **25 points**<br>Student correctly identified primary key of initial relation | **0 points**<br>Major error with identification of primary key or not specified |
| Data anomalies | **15 points**<br>Student correctly describes data anomalies | **0 points**<br>Major errors with description of data anomalies or not specified |
| Functional dependency diagram | **15 points**<br>Student correctly develops functional dependency diagram of initial relation | **0 points**<br>Major errors developing functional dependency diagram or not specified |
| Normalized 3NF relations | **25 points**<br>Student correctly develops the proper set of 3NF relations via normalization | **0 points**<br>Major errors in development of proper set of 3NF relations or not specified |