

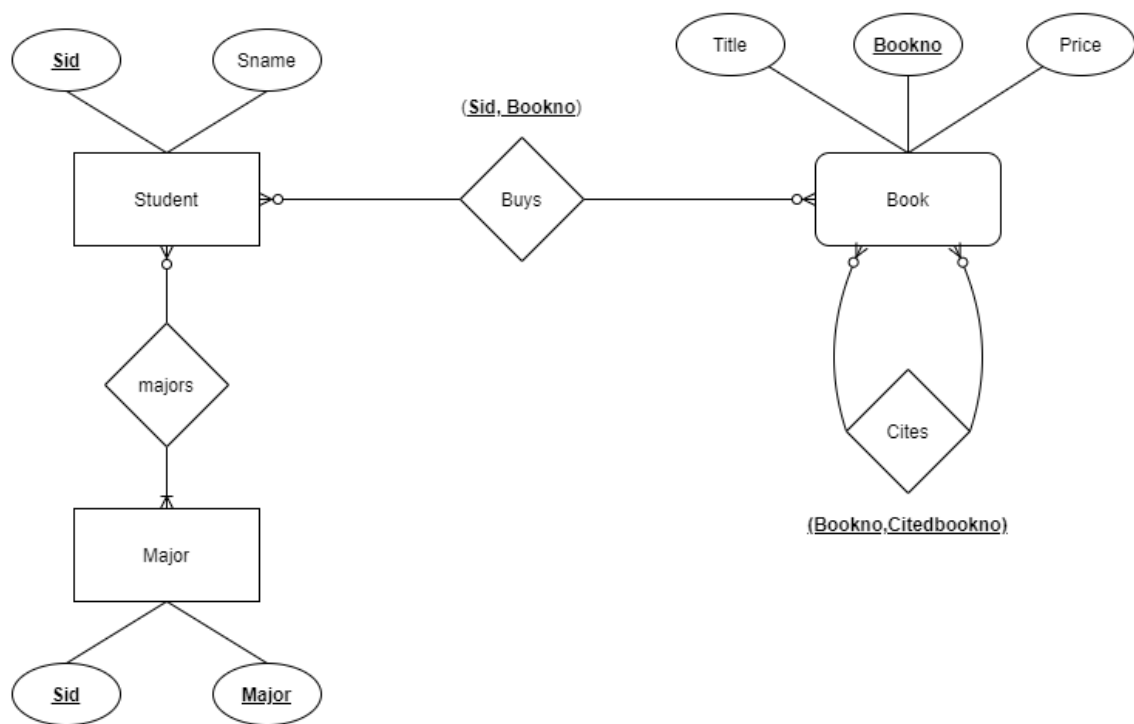
Assignment 7

Part 3: Graph Databases

6. Consider the database schema Student, Course, Buys, Major, and Cites that we have been using throughout the assignments.

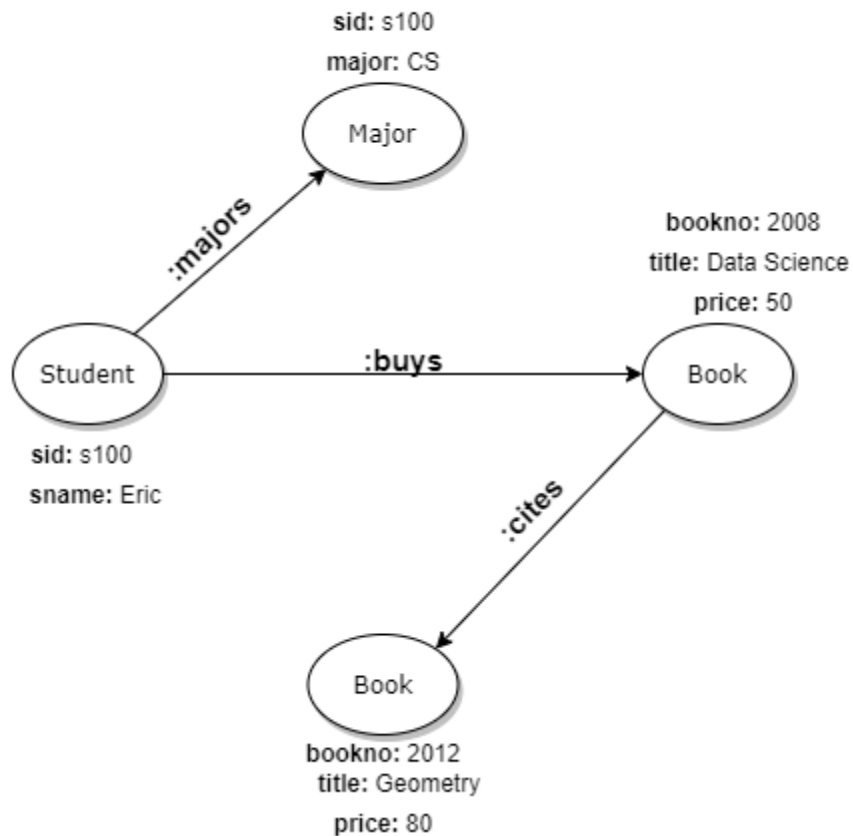
(a) Specify an Entity-Relationship Diagram that models this database schema.

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(b) Specify the node and relationship types of a Property Graph for this database schema. In addition, specify the properties, if any, associated with each such type.

Property Graph By Sanket Pandilwar



7. Using the Property Graph model in Problem 6b, formulate the following queries in the Cypher query language:

(a) Find the types of the relationships associated with Student nodes.

```
match (:student) - [r] -> ()
return type(r)
```

(b) Find each student (node) whose name is 'John' and who bought a book whose price is at least \$50.

```
match(s:student{name:"John"}) - [:buys] -> (b:book)
where b.price>=50
```

```
return s
```

(c) Find each student (node) who bought a book that cites a book whose price is at least \$50.

```
match(s:student) - [:buys] -> (:book) - [:cites] -> (b:book)
where b.price>=50
return s
```

(d) Find each book (node) that is cited directly or indirectly (i.e., recursively) by a book that cost more than \$50.

```
MATCH(b1:Book) - [:cites*] -> (b2:Book)
WHERE b1.price>50
RETURN b2
```

Alternatively,

```
MATCH(b2:Book) - [:citedby*] -> (b1:Book)
WHERE b1.price>50
RETURN b2
```

(e) Find for each book node, that node along with the number of students who major in both CS and in Math and who bought that book.

```
match(b:book) <- [:buys] - (s:student) - [:majors] -> (m1:major),
(s) - [:majors] -> (m2:major)
where m1.major='CS' and m2.major='Math'
return b, count(s)
```

Alternatively,

```
match(b:book) <- [:buys] - (s:student) - [:majors] -> (m:major)
where m.major='CS' and m.major='Math'
return b, count(s)
```