ISTE-230 Introduction to Database & Data Modeling

## Practice Exercise # 12 – Relational Algebra Statements

**Name:** Brian Zarzuela

PART I.

**For each question, show the theoretical relational algebra statement that would accomplish what is requested (not SQL statements) and the resulting relation.**

Use the following relations to answer the questions below:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| STUDENT   |  |  |  | | --- | --- | --- | | StudentID | Name | Major | | 123 | Bill | IT | | 234 | Sue | CS | | 345 | Tom | SE | | 456 | Ann | BUS | | 567 | Linda | IT | | 678 | Tom | IT | | 789 | Sue | LA | | ITSTUDENT   |  |  |  | | --- | --- | --- | | StudentID | Name | Major | | 123 | Bill | IT | | 567 | Linda | IT | | 678 | Tom | IT | | 890 | Jon | IT | | 901 | Lynn | IT | |

1. Perform a union of STUDENT and ITSTUDENT?

**STATEMENT:** STUDENT ⋃ ITSTUDENT

**RELATION:**

|  |  |  |
| --- | --- | --- |
| StudentID | Name | Major |
| 123 | Bill | IT |
| 234 | Sue | CS |
| 345 | Tom | SE |
| 456 | Ann | BUS |
| 567 | Linda | IT |
| 678 | Tom | IT |
| 789 | Sue | LA |
| 890 | Jon | IT |
| 901 | Lynn | IT |

1. Perform an intersection of STUDENT and ITSTUDENT?

**STATEMENT:** STUDENT ⋂ ITSTUDENT

**RELATION:**

|  |  |  |
| --- | --- | --- |
| StudentID | Name | Major |
| 123 | Bill | IT |
| 567 | Linda | IT |
| 678 | Tom | IT |

1. Perform a difference of STUDENT and ITSTUDENT?

**STATEMENT:** STUDENT – ITSTUDENT

**RELATION:**

|  |  |  |
| --- | --- | --- |
| StudentID | Name | Major |
| 234 | Sue | CS |
| 345 | Tom | SE |
| 456 | Ann | BUS |
| 789 | Sue | LA |

1. Perform a difference of ITSTUDENT and STUDENT?

**STATEMENT:** ITSTUDENT – STUDENT

**RELATION:**

|  |  |  |
| --- | --- | --- |
| StudentID | Name | Major |
| 890 | Jon | IT |
| 901 | Lynn | IT |

PART II.

**For each question, show the theoretical relational algebra statement that would accomplish what is requested (not SQL statements) and the resulting relation.**

Use the following relations to answer the questions below:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| STUDENT   |  |  |  | | --- | --- | --- | | StudentID | Name | Major | | 123 | Bill | IT | | 234 | Sue | CS | | 345 | Tom | SE | | 456 | Ann | BUS | | 567 | Linda | IT | | 678 | Tom | IT | | 789 | Sue | LA | | DEPT   |  |  |  |  | | --- | --- | --- | --- | | Dept | Location | AvgSAT | Students | | IT | Bldg 70 | 1250 | 1250 | | CS | Bldg 10 | 1234 | 700 | | SE | Bldg 9 | 1237 | 500 | | HIS | Bldg 13 | 1109 | 67 | | ART | Bldg 56 | 1189 | 70 | |

1. Show the department name and number of students for all departments with greater than 500 students.

**STATEMENT:** DEPT WHERE Students > 500 [Dept, Students]

**RELATION:**

|  |  |
| --- | --- |
| Dept | Students |
| IT | 1250 |
| CS | 700 |

1. Get a list of all students who are majoring in CS or IT. List their student ID and name.

**STATEMENT:** STUDENT WHERE Major = CS OR Major = IT [StudentID, Name]

**RELATION:**

|  |  |
| --- | --- |
| StudentID | Name |
| 123 | Bill |
| 234 | Sue |
| 567 | Linda |
| 678 | Tom |

1. Get a list of all student names.

**STATEMENT:** STUDENT [Name]

**RELATION:**

|  |
| --- |
| Name |
| Bill |
| Sue |
| Tom |
| Ann |
| Linda |

1. Perform a product of the two relations **(do not show the resulting relation for this question, instead answer how many rows would be in the result set)**?

**STATEMENT:** STUDENT x DEPT

**NUMBER OF TUPLES IN RESULT SET:** 35 tuples

1. Show the studentID and name of students majoring in areas not listed in the department relation.

**STATEMENT:** STUDENT LEFT OUTER JOIN (Major = Dept) DEPT WHERE Dept IS Null [StudentID, Name]

**RELATION:**

|  |  |
| --- | --- |
| StudentID | Name |
| 456 | Ann |
| 789 | Sue |