Student Name: \_\_Ciara Lynch\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Student ID: | 1 | 9 | 3 | 5 | 3 | 9 | 4 | 6 |

[Your student numbers ends in 6, right?]

Answer All 3 Questions.

Question 1

Table

Description automatically generated

Table

Description automatically generated

1. Which table has the highest degree? What is the degree of this table?

|  |
| --- |
| Employee with a degree of 10 |

1. Which table has the highest cardinality? What is the cardinality of this table?

|  |
| --- |
| WORKS\_ON with a Cardinality of 16 |

1. Write the Primary Key for each table.

|  |
| --- |
| Employee = super ssn |
| Department = dnumber |
| Dept\_locations =dlocation |
| Works\_on= essn |
| Dependent =Relationshop |
| Project =pnumber |
|  | |

1. Name the Tables that have a Foreign Key and name the attribute that contains the Foreign Key.

|  |
| --- |
| Works\_on and Dependent have the same key ‘ESSN’ which links the the two tables together |

1. Provide the cartesian product of DEPARTMENT and PROJECT. Draw the table and provide the full result set.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Dname** | **Dnumber** | **Mgr\_ssn** | **Mgr\_start\_date** | **Pname** | **Pnumber** | **Plocation** | **Dnum** |
| Research | 5 | 3334445555 | 1988-05-22 | ProductX | 1 | Bellaire | 5 |
| Research | 5 | 3334445555 | 1988-05-22 | ProductY | 2 | Sugarland | 5 |
| Research | 5 | 3334445555 | 1988-05-22 | ProductZ | 3 | Houston | 5 |

Question 2

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **STUDENTS** |  |  |  |  |  |  |
| **id** | **fname** | **lname** | **course** | **year** | **faculty** | **registered** |
| 1001 | John | James | CASE | 2 | ENG | Y |
| 1002 | Mike | Marks | DS | 2 | ENG | Y |
| 1003 | Sarah | Smith | DS | 2 | ENG | Y |
| 1004 | Tanya | Tate | DS | 1 | ENG | N |
| 1005 | Mike | Marks | DS | 1 | SCI | Y |
| 1008 | Sue | Brown | AP | 3 | SCI | Y |
| 1001 | 2 |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **BOOKS** |  |  |  |  |  |  |
| **title** | **author** | **ISBN** | **category** | **Student** |  |  |
| Python | J Bloggs | 13214 | A | 1001 |  |  |
| Java | P Bloggs | 14412 | A | 1001 |  |  |
| Databases | M Bron | 12111 | A | 1001 |  |  |
| Databases II | T Burke | 12111 | A | 1002 |  |  |
| Statistics | A Nolan | 10008 | B | 1005 |  |  |
| AI | A Burns | 12100 | A | 1006 |  |  |
| Chemistry | L Suarez | 14567 | C | 1008 |  |  |
| 1 |  |  |  | 1010 |  |  |

1. Add a tuple to STUDENTS which breaks 2 types of integrity constraint. Explain the two types of integrity constraints.

|  |
| --- |
| A key constraint as I doubled up on 1001 in the ID column  A domain constraint as I added ‘2’ to the fname column rather than a name and this violates the appropriate data type |

1. Add a tuple of Books which breaks 2 types of integrity constraint. Explain the two types of integrity constraints

|  |
| --- |
| I added 1 to the column title as a domain constraint as it doesn’t match the data type  And I also added a key constraint in student as 1010 is not referenced above table. |

1. Identify an 2 existing integrity violation in BOOKS

|  |
| --- |
| In the ISBN column there is a double up on 12111 |
| In students there is also the ID of 1006 but that does not exist already in the other table |

1. Are there any integrity violations in STUDENTS? Explain your answer.

|  |
| --- |
| There are no violations in students as it had no violations until I added my own. |

1. What is the degree of the Cartesian Product of these 2 tables? Explain why.

|  |
| --- |
| 12 student has 7 columns and books has 5 |

1. What is the cardinality of these 2 tables? Explain why.

|  |
| --- |
| There are 7 tuples in students and 8 in books so therefore the cardinality of the tables are 15. |

Question 3

Table

Description automatically generated

Tables T1 and T2 both have 3 columns, where A,P are from the same domain; B,Q are from the same domain; and C,R are from the same domain.

Text, letter

Description automatically generated

Write the results for all 5 questions below (a-e)

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