Homework 4

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CS 5530 Spring 2022

# Part 1

1.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **T1.A** | **Q** | **R** | **T2.A** | **B** | **C** |
| 20 | a | 5 | 20 | b | 6 |
| 20 | a | 5 | 20 | b | 5 |

2.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **T1.A** | **Q** | **R** | **T2.A** | **B** | **C** |
| 25 | b | 8 | 20 | b | 6 |
| 25 | b | 8 | 20 | b | 5 |

3.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **A** | **Q** | **R** | **B** | **C** |
| 20 | a | 5 | b | 6 |
| 20 | a | 5 | b | 5 |

4.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **T1.A** | **Q** | **R** | **T2.A** | **B** | **C** |
| 20 | a | 5 | 20 | b | 5 |

# Part 2

1. σT2.x==T3.x&&T2.y==T3.y(T2 × T3)
2. πx(T2) – (πx(T2) – T1)
3. πz(σT3.y==T2.y(T2 × T3))
4. πx(T2) – πx((πx(T2) × T1) – T2)

# Part 3

1. πName(σElo>=2850(Players))
2. πName(Players ⋈pID==wpID Games)
3. πName(σResult=="W"(Players ⋈pID==wpID Games))
4. ρ(GamesIn2018, σYear==2018(Events ⋈ Games))

πEvents.Name(Players ⋈pID==wpID||pID==bpID GamesIn2018)

1. ρ(GamesCarlsenPlayedWhite, σName=="Magnus Carlsen"(Players) ⋈pID==wpID Games)

ρ(GamesCarlsenPlayedBlack, σName=="Magnus Carlsen"(Players) ⋈pID==bpID Games)

ρ(GamesCarlsenLost,

σResult=="W"(GamesCarlsenPlayedBlack) ∪ σResult=="B"(GamesCarlsenPlayedWhite))

πEvents.Name, Year(Events ⋈ GamesCarlsenLost)

1. ρ(BlackOpponentspID / bpID, πbpID(σName=="Magnus Carlsen"(Players) ⋈pID==wpID Games))

ρ(WhiteOpponentspID / wpID, πwpID(σName=="Magnus Carlsen"(Players) ⋈pID==bpID Games))

ρ(AllOpponents, BlackOpponents ∪ WhiteOpponents)

πName(Players ⋈AllOpponents)

1. ρ(PIDsHaveLostAsWhitepID / wpID, πwpID(σResult=="B"(Games)))

ρ(PIDsHaveLostAsBlackpID / bpID, πbpID(σResult=="W"(Games)))

ρ(PIDsHaveLost, PIDsHaveLostAsWhite ∪ PIDsHaveLostAsBlack)

ρ(PIDsNeverLost, πpID(Players) – PIDsHaveLost))

πName(Players ⋈ PIDsNeverLost)

# Part 4

|  |
| --- |
| **Name** |
| Jon |
| Abby |

* 1. Names of students who are enrolled in at least one course and have not earned a C from any course they’re enrolled in.

|  |
| --- |
| **Name** |

* 1. Names of students who share Maria’s DOB.

|  |
| --- |
| **cName** |

* 1. Names of courses that enroll all students.

1. ρ(3xxxLevelCIDs, πcID(σcID>=3000&&CID<4000(Courses)))

πName(πsID, cID(Students ⋈ Enroll) / 3xxxLevelCIDs)

1. ρ(Steve, πsID(σName=="Steve"(Students)))

ρ(StevesCIDs, πcID(Steve ⋈ Enroll))

ρ(StevesBFFs, (πsID, cID(Enroll) / StevesCIDs) – Steve)

πName(Students ⋈ StevesBFFs)