

### DS 320: Homework 3

Due: Tuesday, October 16, 2018, 11:59pm (EST)

Name: \_\_\_\_\_

Question	Points	Score
1	10	
2	20	
3	5	
4	5	
5	10	
Total	50	

1. (10 points) Consider the following two data sources and their mediated schema:

**Source S1:**

Customers (ID, firstName, lastName, Address)

Products (ID, title, basePrice)

Purchases (cID, pID, date, quantity, totalPrice)

**Source S2:**

Cust (cID, cName, cAddress)

Items (iID, iTITLE, iPrice)

Transactions (tID, cID, tDate, tTotal)

Transactions\_Details (tID, iID, quantity, price)

**Mediated schema:**

Cust (ID, fullName, address)

Products (ID, title, unitPrice)

Sales (cID, pID, date, totalPrice)

Propose a set of view mappings between your data sources and your mediated schema using global-as-view mapping.

2) (20 points) Consider the following dynamic programming equations for the global alignment algorithm (left) and scoring matrix (right):

$$s(i, j) = \max \begin{cases} s(i-1, j-1) + c(x_i, y_j) \\ s(i-1, j) - c_g \\ s(i, j-1) - c_g \end{cases}$$

$$\begin{aligned} s(0, j) &= -jc_g \\ s(i, 0) &= -ic_g \end{aligned}$$

	d	a	v	e
d	2	-1	-1	-1
a	-1	2	-1	-1
v	-1	-1	2	-1
e	-1	-1	-1	2

i) (10 points) Show the dynamic programming matrix between 'daave' and 'dva' using a gap penalty equals 2.

ii) (10 points) Write down the optimal alignment score and the corresponding alignment between the two strings.

3. (5 points) In matching elements between two schemas explain why we need to employ more than one matcher.

4. (5 points) Given two schemas S and T where S has 10 Tables and 45 elements while T has only one Table with 4 attributes. How many machine learning classifiers do you need to train in order to match elements in the two schemas? Explain how to get the training data for training one of these classifiers.

5. (10 points) Map the following java objects into a relational database schema

```
public class Person {  
    public string name  
}
```

```
Public class Student extends Person {  
    Public string studentNumber  
}
```

```
Public class Professor extends Person {  
    Public double salary  
}
```