Lab 08 CSC 120

1. (+5) Given the two relations X and Y below

X: U V W Y: R S

a s 5 3 J

b z 3 4 K

c d 4

which relation below ( A B C D) or selection E, would be produced by the following

statements?

Temp ← JOIN X and Y where X.W > Y.R

Result ← PROJECT X.U, Y.S from Temp

A B C D

X.U Y.S X.U Y.S X.U Y.S X.U Y.S

a J a J b K a J

a K a K c J b K

c J a J

E. None of A B C D above

1. (+5) Suppose you are given the following set of keys to insert into a hash table that holds exactly 11 values: 113 , 117 , 97 , 100 , 114 , 108 , 116 , 105 , 99 using the hash function h(item) = item%11 Which key would cause the first collision ? **Reference: URL in the Hash tables item**
2. 114
3. 117
4. 108
5. 116
6. (+10) a. Suppose you are given the following set of keys to insert into a hash table that holds exactly 11 values: 113 , 117 , 97 , 100 , 114 , 123 , 116 , 98 , 99 using the hash function h(item) = item%11 Fill in the following hash table **Reference: URL in the Hash tables item** 113 is provided since 113%11 = 3

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Hash(value) |
| 99 | 100 | 123 | 113 | 114 |  | 116 | 117 |  | 97 | 98 | value |

b. Since the hash table holds exactly 11 values and there are only 9 keys, which two key values are not used ?

Values 5 and 8 aren’t used

1. (+5) Given the two relations X and Y below

X: U V W Y: R S

a s 5 3 J

b z 3 4 K

c d 4 2 N

Complete the table (relation) which would be produced by the following

statements?

Temp ← JOIN X and Y where X.W > Y.R OR X.W = Y.R

Result ← PROJECT X.W, Y.S from Temp

X.W Y.S

**5 J**

**5 K**

**5 N**

**3 J**

**3 N**

**4 J**

**4 K**

**4 N**

**HINT:** The relation should has two attributes (X.W and Y.S == columns) and **6 tuples** (rows)

1. (+5) Chapter Review # 13

***Answers a and c provided Only the answer b is required see below***

a. Which companies make Bolt 2Z?

ANS:

TEMP ← SELECT from Manufacturer where PartName = "bolt 2Z"

RESULT ← PROJECT CompanyName from TEMP

c. Which companies make a part with weight 1

ANS

TEMP1 ← JOIN PART and Manufacturer

where PART.PartName = MANUFACTURER.PartName

TEMP2 ← SELECT from TEMP1 where PART.Weight = 1

RESULT ← PROJECT Manufacturer.CompanyName from TEMP2

***Question b reads as follows:***

b. Answers the query: *Obtain a list of the parts made by Company X along with each parts cost?*

***Hint there should be a SELECT followed by PROJECT***

***Temp1 = SELECT from manufacturer where CompanyName = Company X***

***Result = PROJECT partname and cost from temp1***

1. (+ 15)Answer the four questions from Question 12 in the Chapter review problems (You should be providing tables as an answer )
   1. HINT: 1 column and 3 rows *Answer Provided* *below*
   2. HINT: 3 columns and 2 rows
   3. HINT: 1 columns and 2 rows
   4. HINT: 5 columns and 5 rows

a. W b. U V W c. S

5 A Z 5 J

3 C Q 5 K

5

* 1. A z 5 3 j

A z 5 4 k

B d 3 3 j

C q 5 3 j

C q 5 4 k

1. (+10) Given the two relations X and Y below (use the relations in both a and b)

X: A B Y: C D

2 s t 1

5 z r 3

w 2

a. Provide the rows in the relation below that would be produced by the following statements

Temp ← JOIN X and Y where X.A > Y.D

Result ← PROJECT X.B, Y.C from Temp

**HINT:** The relation should have two attributes (X.B and Y.C == columns) and **4 tuples** (rows)

X.B Y.C

5 t

2 t

2 r

2 w

b. complete the rows in the relation below that would result by the following statements

Temp ← JOIN X and Y where X.A <= Y.D

Result ← PROJECT Y.D from Temp

**HINT:** The relation should have one attributes (Y.D == column) and two rows

Y.D

**1**

**2**

1. (+5) Chapter review problem # 43. Which of the following statement answers the question posed in the problem ?
2. The sum computed by T1 would be $100 too small
3. The sum computed by T1 would be $200 too large
4. The sum computed by T1 would be $100 too large
5. The sum computed by T1 would be correct but the balance of A and B are incorrect.
6. (+5) Chapter review problem # 33. Which reads as follows:

On the basis of figure 9.5 (EMPLOYEE, JOB ASSIGNMENT relations) state the question that is answered by the following program segment

TEMP1 🡸 Join EMPLOYEE and ASSIGNMENT

where EMPLOYEE.EmpId = ASSIGNMENT.EmpId

TEMP2 🡸 SELECT from TEMP1 where TermDate = ‘\*’

RESULT 🡸 PROJECT Name, Start Date from TEMP2

*NOTE: \* means the employee is still working*

ANS: The question that is answered is: What is the name and the starting date of an employee?

1. (+5) On the basis of figure 9.5 (EMPLOYEE, JOB ASSIGNMENT relations) state the question that is answered by the following program segment

TEMP1 🡸 Join EMPLOYEE and ASSIGNMENT

where EMPLOYEE.EmpId = ASSIGNMENT.EmpId

TEMP2 🡸 SELECT from TEMP1 where JobId = S26Z

TEMP3 🡸 Join TEMP2 and JOB

where TEMP2.JobId = JOB.JobId

RESULT 🡸 PROJECT Name, Job Title

ANS: The question that is answered is: What is the name and the job title of the employee given the employee and assignment id?

(+40) each of the problems are worth 4 points

Using the list **names** defined below; write a Python program that will

1. Display a string that consists of the **first** letter and **last** letter from each of the names in the list a

*The output should look like “EdAsNn etc. use the + operator or the append() function from prior lab*

1. Display list names with all the names reversed that is display

“dilcuE”, sedemihcrA” etc.

1. Display the **total** number of characters in the list *Hint: Sum the lengths of each name*
2. *In the prior lab we determined the number of vowels in the list. For this lab, display the number of consonants (non-vowels) Use your result from 3. to assist in the calculations*
3. Code for the vowel count

a = [ "Euclid", "Archimedes", "Newton”, “Descartes", "Fermat", "Turing", "Euler", "Einstein", "Boole", "Fibonacci", "Nash"]  
vowel = ['A', 'a', 'E', 'e', 'I', 'i', 'O', 'o', 'U','u']  
vowelCnt = 0  
for k in a:  
 j = 0  
 while j < len(k):  
 if k[j] in vowel:  
 vowelCnt = vowelCnt + 1  
 j = j + 1  
print("Number of vowels :", vowelCnt) # 31

1. Display the number of each letter in the list ***NOTE ignore case ‘A’ and ‘a’*** are to be considered the same. See code below starts with alphaCnt (There are eight ‘A’ in the list ) as well as the code

print(**'1 '**,ord(**'A'**)-ord(**'A'**)) # 0

print(**'2 '**,ord(**'B'**)-ord(**'A'**)) # 1

print(**'3 '**,ord(**'C'**)-ord(**'A'**)) # 3

…

print(**'26 '**,ord(**'Z'**)-ord(**'A'**)) # 25

Suggested output: (alphaCnt list :

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 2 | 5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 0 | 0 |

Read the list above as follows: There are 8 A’s , 2 B’s 5 C’s …. 0 Y and 0 Z (ignoring case )

1. Display the average length of all the entries in the list names. Add the lengths of each entry and divide by the length of names
2. Once you have populated alphaCnt (== number of letters in the list names) display the letter that occurs the most in alphaCnt **HINT: index of the max(alphaCount)**
3. Once you have populated alphaCnt (== number of letters in the list names) display the letters that have a value of zero. We know that Y and Z have a value of zero but what are the other characters. **HINT: assume alphaCnt[k] == 0 which character?**
4. Sort the list names and display the median name Do not use constants as 7 or 8 use integer division

*#CSC120Lab08Template*

names = [**"Euclid"**, **"Archimedes"**, **"Newton"**, **"Descartes"**, **"Fermat"**,  
 **"Turing"**, **"Euler"**, **"Einstein"**, **"Boole"**, **"Fibonacci"**,  
 **"Nash"**, **"Wiles"**, **"Cantor"**, **"Gauss"**, **"Plato"**] *# Initial list n == 15*alphaCount = [0,0,0,0,0,0,0,0,0,0,0,0, 0,0,0,0,0,0,0,0,0,0,0,0,0,0] *# length == 26*print(**'0'**, names)  
print (**'1'**, alphaCount)  
  
*# first letter and last letter in name*j = 0  
cnt = 1  
*#for k in names:  
 print(cnt, k, len(k), k[j], k[len(k) - 1]) # first letter and last letter in name  
# cnt = cnt + 1*

s = 0  
letter = **'A'  
for** name **in** names: *# go through each name and see how many i and I there are* r = name.count(letter.upper())  
 s = s + r  
print(**"the number of "**, letter.upper(), **" == "**, s) *# number of A or uppercase I  
  
# code to determine the number of A' B C D E etc in names and store in alphaCount*print(**' ord values for characters '**)  
print(**'1 '**,ord(**'A'**)-ord(**'A'**)) *# 0*print(**'2 '**,ord(**'B'**)-ord(**'A'**)) *# 1*print(**'3 '**,ord(**'C'**)-ord(**'A'**)) *# 2  
# .....*print(**'26 '**,ord(**'Z'**)-ord(**'A'**))  
s = **'ABCDEFGHIJKLMNOPQRSTUVWXYZAAABBB'** *# arbitrary string with 4 A 4 B***for** ch **in** s: *## looping , ... through the string* x = ord(ch.upper()) - ord(**'A'**) *# to uppercase; determine place in alphaCnt  
 # print(ch, ' ord value == ', x)* alphaCount[x] = alphaCount[x] + 1 *# increment the array alphaCnt*print(**'alphaCount == '**, alphaCount) *# number of ‘A’, ‘B’ etc characters in s*

**OUTPUT:**

0 ['Euclid', 'Archimedes', 'Newton', 'Descartes', 'Fermat', 'Turing', 'Euler', 'Einstein', 'Boole', 'Fibonacci', 'Nash', 'Wiles', 'Cantor', 'Gauss', 'Plato']

1 [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]

the number of A == 1

ord values for characters

1 0

2 1

3 2

26 25

alphaCount == [4, 4, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1]

...

***Please save your code as YourLastnameLab08.py***