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

d h 7

Provide the relation (table) that 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 (there should be 5 rows )

X.U Y.S

a J

a K

c J

d J

d K

1. (+5) Suppose you are given the following set of nine (9) keys---- 113 , 117 , 97 , 100 , 114 , 108 , 116 , 105 , 99 ---to insert into a hash table that holds exactly 11 values using the hash function h(key) = key%11 Which key would cause the first collision ?

**Reference: URL in the Hash tables item**

1. 114
2. 117
3. 108
4. 116
5. a(+10) 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 (113 is in the table since 113%11 = 3)

**Reference: URL in the Hash tables item**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Hash(item) |
| 99 | 100 | 123 | 113 | 114 | 115 | 116 | 117 | 96 | 97 | 98 | item |

b. Provide a key (integer) x > 100 such that h(x) = x % 11 **results** in the value 5

x = \_\_\_\_\_\_\_\_115\_\_\_\_\_\_\_\_

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) that would be produced by the following

statements? HINT: two attributes (X.W and Y.S == columns) and **8 tuples** (rows)

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

1. (+5) Chapter Review # 13

***Answers a and b provided Only answer c is required to be completed see below***

*a. Which companies make Bolt 2Z?*

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

RESULT ← PROJECT CompanyName from TEMP

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

TEMP ← SELECT from MANUFACTURER where CompanyName = COMPANY X

RESULT ← PROJECT PartName, Cost from TEMP

c. Which companies make a part with weight 1

TEMP1 ← JOIN PART and Manufacturer

where PART.PartName = MANUFACTURER.PartName

***SELECT and PROJECT needed***

TEMP2 ← SELECT from TEMP1 where TEMP1.Weight = 1

RESULT ← PROJECT CompanyName from Temp2

1. (+ 5) From Question 12 in the Chapter review problems Answer part D only (You should be providing tables as an answer ) Answers a b and c are provided

a. W b. U V W *c. S*

5 A Z 5 *J*

3 C Q 5 *K*

5

d. X.U X.V X.W Y.R Y.S (5 rows )

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

S t

Z t

Z r

Z 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

Y.D

**3**

**2**

1. (+5) Chapter review problem # 33. Which reads as follows:

On the basis of figure 9.5 (EMPLOYEE, JOB ASSIGNMENT relations) provide the relation (table) 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:

|  |  |
| --- | --- |
| **Name** | **Start Date** |
| **Cheryl H. Clark** | **10-1-2009** |
| **G. Jerry Smith** | **5-1-2010** |

1. (+5) On the basis of figure 9.5 (EMPLOYEE, JOB ASSIGNMENT relations) provide the relation (table) 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:

|  |  |
| --- | --- |
| **Name** | **Job Title** |
| **G. Jerry Smith** | **Secretary** |

1. (+5) Given the two relations X and Y with relation X has a columns and b rows while relation Y has c columns and d rows then the JOIN of X and Y would result in a relation consisting of :
2. a \* c columns and b\*d rows
3. b + d columns and a\*c rows
4. a + c columns and b\*d rows
5. a + b columns and c\*d rows
6. None of these

(+50) each problem worth 5 points

Using the list **names** defined as follows:names = [**"Euclid"**, **"Archimedes"**, **"Newton"**, **"Descartes"**, **"Fermat"**,  
 **"Turing"**, **"Euler"**, **"Einstein"**, **"Boole"**, **"Fibonacci"**, **"Lovelace"**,  
 **"Noether"**, **"Nash"**, **"Wiles"**, **"Cantor"**, **"Gauss"**, **"Plato"**]

*# Initial list n == 17*

write a Python program that will (Expected output at the end of the document )

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 be “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. HINT: Use a stack

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*

**Code example for vowel count uses the following list.**

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 alphaCnt which contains the number of each letter in the list ***NOTE ignore case ‘A’ and ‘a’*** . See code below starts with alphaCnt (There are eight ‘A’ in the list ) as well as the code

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 )

Code to consider :

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

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 the list 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) Consider the chr() function**

print(chr(65)) # A  
i = 12  
print(chr(65+i))# M

1. Once you have populated alphaCnt (== number of letters in the list names) display the letters that have a value of zero besides Y and Z. **HINT: assume alphaCnt[k] == 0 which character ?**
2. Sort the list names and display the median name Do not use constants as 8 or 9 use integer division with the n = len(names)
3. *Display the number of vowels in names Use the results from 3 and 4 above*

*#CSC120Lab08Template*

*# CSC120  
# Lab 08 Template*names = [**"Euclid"**, **"Archimedes"**, **"Newton"**, **"Descartes"**, **"Fermat"**,  
 **"Turing"**, **"Euler"**, **"Einstein"**, **"Boole"**, **"Fibonacci"**, **"Lovelace"**,  
 **"Noether"**, **"Nash"**, **"Wiles"**, **"Cantor"**, **"Gauss"**, **"Plato"**] *# Initial list n == 17  
# we will use alphaCount to store the number of characters in names.  
# alphaCount[0] will contain the number of A and a  
# alphaCount[1] will contain the number of B and b  
# ….  
# …  
# # alphaCount[25] will contain the number of Z and z*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 names uncomment if you want  
# use the code uncomment if you wish*j = 0  
cnt = 0  
*#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  
  
# number of 'a' or 'A' using upper() function a == A*s = 0  
print(**'Counting character a or A in names '**)  
ch = **'a'  
for** eachName **in** names: *# for each name in names* **for** letter **in** eachName: *# for each letter in the name* **if** letter == ch.upper()**or** letter == ch:  
 s = s + 1  
print(**'Number of A or a in names is '**, s)  
  
*# code to determine the number of A' B C D E etc in names and  
# store in alphaCount using ord*print(**'========ORD Values==================='**)  
print(**' ord values for characters '**)  
print(**'1 '**,ord(**'A'**)-ord(**'A'**)) *# 0 position in alphCount for A*print(**'2 '**,ord(**'B'**)-ord(**'A'**)) *# 1 position in alphCount for B*print(**'3 '**,ord(**'C'**)-ord(**'A'**)) *# 2 position in alphCount for C  
# .....*print(**'26 '**,ord(**'Z'**)-ord(**'A'**)) *# 25 position in alphCount for Z*print(**'AN EXAMPLE counting the number of characters in string name[1] '**)  
s = names[1] *#* ***Archimedes*** *# similar code needed for the list of names*print(**'s = '**,s)  
**for** ch **in** s: *# each character* x = ord(ch.upper()) - ord(**'A'**) *# to uppercase;* print(**'x == '**,x) *# determine place in alphaCnt* alphaCount[x] = alphaCount[x] + 1 *# increment the array*

*# alphaCnt[x]*print(**'alphaCount == '**, alphaCount) *# number of ‘A’, ‘B’ etc*

*# characters in s*print(**'====FIX the next calculations '  
 'an example of what is EXPECTED ===== '**)  
x =**'EdAsNn'**print(**'1. string consisting of first and last letter '**,x )  
print(**'2. names reversed '**,x )  
print(**'3. total number of characters '**,len(x) )  
print(**'4. total number of consonants '**,len(x) )  
print(**'5. printout of alphaCount == \n'**,alphaCount )  
print(**'6. average length of all the names '**,len(x) )  
print(**'7. the letter that appears most frequent '**,**'Z'** )  
print(**'8. the letter that have a value of 0 in alphaCount '**,**'ABXYZ'** )  
print(**'9. the median name in list names is '**,**'CSC 120'** )  
print(**'10.the number of vowels in names is '**,333 )

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