OOAD

Lab Practice Problems on JAVA

1. Given two matrices A and B find its product using JAVA where A and B are *Cartan* matrices.
   A *Cartan* matrix is a square integer matrix who elements **($A_{i,j}$)** satisfy the following conditions.
   - $A_{i,j}$ is an integer, one of belongs to {-3, -2, -1, 0, 2}.
   - $A_{i,j} = 2$ the diagonal entries are all 2.
   - $A_{i,j} \leq 0$ of the diagonal.
   - $A_{i,j} = 0$ iff $A_{j,i} = 0$.

   More about *Cartan* matrix can be found in http://mathworld.wolfram.com/CartanMatrix.html

2. WAP to find the non overlapping sub-matrix of the given matrix of given order. If the given matrix is *A* and order of sub-matrix is 2 then

$$A = \begin{bmatrix} 1 & 3 & 7 & 8 \\ 6 & 5 & 3 & 2 \\ 9 & 7 & 8 & 1 \\ 0 & 7 & 0 & 6 \end{bmatrix} \Rightarrow \begin{bmatrix} 1 & 3 \\ 6 & 5 \end{bmatrix} \begin{bmatrix} 7 & 8 \\ 3 & 2 \end{bmatrix} \begin{bmatrix} 9 & 7 \\ 0 & 7 \end{bmatrix} \begin{bmatrix} 8 & 1 \\ 0 & 6 \end{bmatrix}$$

3. Write a Java program that converts an English word into PigLatin. To do that there are three rules: if the word starts with a vowel add way to the end, ex. **apple=appleway**. If the word has a vowel but doesn't start with it then take the consonants it front of the first vowel and put them to the end of the word and add ay to the end. ex: **ball=allbay, strong=ongstray**. and if the word has no vowels just add ay to the end. ex. **pfft=pfftay**.

   Suppose the string is "**Proud to be an MNITian**" then its corresponding **piglatin** string is "**Oudpray otay ebay anway MNITianway**".
   (piglatin translator is available in http://www.snowcrest.net/donnelly/piglatin.html).

4. Provided that you have a given number of small rice bags (1 kilo each) and big rice bags (5 kilo each), write a method that returns the minimum number of small bags necessary to package goal kilos of rice. Return -1 if it is not possible to package the required rice amount with the bags provided.