

1 あるフルーツショップのリンゴ・みかん・柿の値段と重さは下の表の通りである.

	リンゴ	みかん	柿
値段	200 円/個	60 円/個	150 円/個
重さ	350 g/個	100 g/個	250 g/個

また、この店で、大小の詰め合せ籠を売っていて、その内容は下の表の通りである.

	大	小
リンゴ	5 個/カゴ	2 個/カゴ
みかん	6 個/カゴ	3 個/カゴ
柿	4 個/カゴ	1 個/カゴ

a) 大籠の詰め合わせの中味の値段の総額はどのように計算されるかを示せ. このとき単位にも注意すること.

b) 大籠の詰め合わせの中味の総重量はどのように計算されるかを示せ.

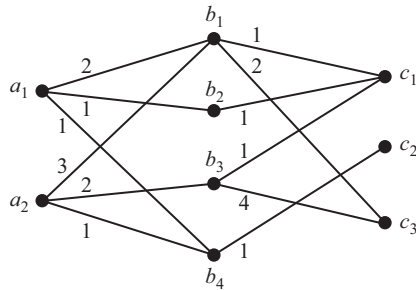
c) 小籠の詰め合わせの中味の総額と総重量を同様に計算せよ.

d) 大小それぞれの詰め合せ籠の中味の総額・総重量を示す表を作れ. このとき単位も書き込むこと.

	大	小
値段		
重さ		



2 The diagram below indicates the number of daily international flights between major airports in three different countries A, B, and C. The number attached to each connecting line shows how many flights there are between the two airports. For instance, from airport  $b_3$  in country B there are 4 flights to airport  $c_3$  in country C each day, but none to airport  $c_2$  in country C.



The relevant data can also be represented by the two matrices

$$P : \begin{matrix} & & b_1 & b_2 & b_3 & b_4 \\ a_1 & & \left( \begin{array}{cccc} 2 & 1 & 0 & 1 \end{array} \right) \\ a_2 & & \left( \begin{array}{cccc} 3 & 0 & 2 & 1 \end{array} \right) \end{matrix} \quad Q : \begin{matrix} & c_1 & c_2 & c_3 \\ b_1 & \left( \begin{array}{ccc} 1 & 0 & 2 \end{array} \right) \\ b_2 & \left( \begin{array}{ccc} 1 & 0 & 0 \end{array} \right) \\ b_3 & \left( \begin{array}{ccc} 1 & 0 & 4 \end{array} \right) \\ b_4 & \left( \begin{array}{ccc} 0 & 1 & 0 \end{array} \right) \end{matrix}$$

Each component of the matrix  $P$  represents the number of choices of flight between  $a_i$  and  $b_j$ , while each component of  $Q$  represents the number of choices of flight between  $b_j$  and  $c_k$ .

a) How many ways are there of getting from  $a_i$  to  $c_k$  using two flights, with one connection in country B?

Draw a similar diagram as above without the cities  $b_i$ .

b) Write down the matrix  $R$  each of whose component represents the number of choices of flight between  $a_i$  and  $c_k$ .

c) Calculate the product  $PQ$ , and verify that it coincides with  $R$ .

3 行列  $A, B$  を

$$A = \begin{pmatrix} 1 & 4 & 7 \\ 2 & 5 & 8 \\ 3 & 6 & 9 \end{pmatrix} \quad B = \begin{pmatrix} 0 & 1 & -1 \\ -1 & 0 & 1 \\ 1 & -1 & 0 \end{pmatrix}$$

とおくとき、 $AB, BA$  を計算せよ.