Test 1

Q1

(a) Volume:

There are different types of goods in the supermarket, so the volume of the supermarket server are always large. Also, supermarket is one of the place that people must go, each day there are lots of people going to supermarket to buy things, those transaction also are in a large file size.

Velocity:

There are large number of branch in one supermarket brand, each bra
serve large number of customers, the transaction record will produce so fast and that means the velocity of the data produce is so fast.

6

(b) S1 means day 1 and S^T1 means the total sales amount.

2

Q2

(a)(1)

It is a 7 x 7 matrix whose ij-th entry is the number of weight of the cost.

It is a square matrix.

	a	b	c	d	e	f	g
a	0	6	2	0	0	0	0
b	-6	0	-7	5	0	0	0
c	-2	7	0	0	3	8	0
d	0	-5	0	0	0	0	3
e	0	0	-3	0	0	0	10
f	0	0	-8	0	0	0	1
g	0	0	0	-3	-10	-1	0

3

(a)(2)

Since C(a)=0, put a to S

S=(a), previous(a) = Nil

S=(a)

C(b)=0+6=6, previous(b)=a

C(c)=0+2=2, previous(c)=a

c is with min cost ,so put c to S

S=(a,c)

S=(a,c)

b,e,f are neighbours to c

no update

C(b)=2+7=9>6, C(b)=6, previous(b)=a

update

C(e)=2+3=5, previous(e)=c

C(f)=2+8=10, previous(f)=c

b,e,f are with min cost ,so put b,e,f to S

S=(a,b,c,e,f)

S=(a,b,c,e,f)
d is neighbour to b
update
C(d)=6+5=11, previous(d)=b
d is with min cost, so put d to S
S=(a,b,c,d,e,f)

S=(a,b,c,d,e,f)
g is neighbour to d,e,f
update
C(g)=11+3=14, previous(g)=d
C(g)=5+10=15>14, C(g)=14, previous(g)=d
C(g)=10+1=11<14, C(g)=11, previous(g)=f
g is with min cost ,so put g to S
S=(a,b,c,d,e,f,g)

S=(a,b,c,d,e,f,g)
C(b)=6, previous(b)=a
C(c)=2, previous(c)=a
C(d)=11, previous(d)=b
C(e)=5, previous(e)=c
C(f)=10, previous(f)=c
C(g)=11, previous(g)=f

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Using back track, we can find out the shortest path.
For a to g, cost of the path is 11, previous(g)=f, previous(f)=c and previous(c)=a
Therefore, the path from a to g is a→c→f→g
(b)(1)

(b)(2)

Q3
(a) d_{BC} = C - B
=(-3 6) - (6 3)
= (-9 3)

2

(b) Because it is a parallelogram
So AB = CD
(2 1)-(6 3) = (-3 6) - D
(-4 -2) = (-3 6) – D
D = (-3 6) – (-4 -2)
D = (1 8)
So the coordinates of D is (1 8)

2

(c) B(6 3) ,C(-3 6) ,D(1 8)
Let x and y are the constant

6x-3x=1
3x=1
X=1/3

3y+6y=8
9y=8
Y=8/9

0

(d)
The coordinates of P = (1(-3)+m(6))/m , (1(6)-m(3))/m
=((3(2m-1))/m (3(2-m))/m)
dAP = A-P
=(2 1) – ((3(2m-1))/m (3(2-m))/m)
= ((3+4m)/m (4m-6)/m)

4

(e)

Q4
(a1)For right hand side
$(P-2I)(P-I)$ =(x_1^2-3x_1-2 x_2^2 x_3^2)
(X_4^2 x_5^2-3x_5-2 x_6^2)
(X_7^2 x_8^2 x_9^2-2x_9-2)
For the left hand side
$P^2-3P+2I$ = (x_1^2-3x_1-2 x_2^2 x_3^2)
(X_4^2 x_5^2-3x_5-2 x_6^2)
(X_7^2 x_8^2 x_9^2-2x_9-2)
So $(P-2I)(P-I)=P^2-3P+2I$

3

(a2) M^2 – 3M +2I = 0
(4 9 0) – (6 9 0) +(2 0 0) (0 0 0)
(0 1 0) – (0 3 0) +(0 2 0) = (0 0 0)
(0 0 1) – (0 0 3) +(0 0 2) (0 0 0)

3

(a3) 2(1-0)-3(0-0)+0(0-0) = 2

3

(a4) Yes because by quadratic equation, p=2 or p = 1.

0

(b)Size of B is 5 x 4
Size of C is 4 x 3
Size of Q is 9 x 7
Because I and A are the diagonal of block matrix Q.

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(c)There is no change after A x X.

0