(a) How will you initialize a three-dimensional array **threed[3][2][3]**? How will you refer the first and last element in this array?

(b) Write a program to pick up the largest number from any 5 row by 5 column matrix.

(c) Write a program to obtain transpose of a 4 x 4 matrix. The transpose of a matrix is obtained by exchanging the elements of each row with the elements of the corresponding column.

(d) Match the following with reference to the program segment given below:

```
int i, j, = 25 ;
int *pi, *pj = & j ;
```

```
/* more lines of program */
*pj = j + 5 ;
j = *pj + 5 ;
pj = pj ;
*pi = i + j ;
```

Each integer quantity occupies 2 bytes of memory. The value assigned to i begin at (hexadecimal) address F9C and the value assigned to j begins at address F9E. Match the value represented by left hand side quantities with the right.

1.	&i	a.	30
2.	&j	b.	F9E
3.	pj	c.	35
4.	*pj	d.	FA2
5.	i	e.	F9C
6.	pi	f.	67
7.	*pi	g.	unspecified
8.	(pi + 2)	h.	65
9.	(*pi + 2)	i.	F9E
10.	* (pi + 2)	j.	F9E
		k.	FAO
		l.	F9D

(e) Match the following with reference to the following program segment:

```
int x[ 3 ][ 5 ] = {
                    { 1, 2, 3, 4, 5 },
                    { 6, 7, 8, 9, 10 },
                    { 11, 12, 13, 14, 15 }
                  }, *n = &x ;
```

1.	*(*(x + 2) + 1)	a.	9
2.	*(*x + 2) + 5	b.	13
3.	*(*(x + 1))	c.	4
4.	*(*(x) + 2) + 1	d.	3
5.	* (*(x + 1) + 3)	e.	2
6.	*n	f.	12
7.	*(n +2)	g.	14
8.	(*(n + 3) + 1	h.	7
9.	*(n + 5)+1	i.	1

10.	++*n	j.	8
		k.	5
		l.	10
		m.	6

(f) Match the following with reference to the following program segment:

```
unsigned int arr[ 3 ][ 3 ] = {
                              2, 4, 6,
                              9, 1, 10,
                              16, 64, 5
                            };
```

1.	**arr	a.	64
2.	**arr < *(*arr + 2)	b.	18
3.	*(arr + 2) / (*(*arr + 1) > **arr)	c.	6
4.	*(arr[1] + 1) | arr[1][2]	d.	3
5.	*(arr[0]) | *(arr[2])	e.	0
6.	arr[1][1] < arr[0][1]	f.	16
7.	arr[2][[1] & arr[2][0]	g.	1
8.	arr[2][2] | arr[0][1]	h.	11
9.	arr[0][1] ^ arr[0][2]	i.	20
10.	++**arr + --arr[1][1]	j.	2
		k.	5
		l.	4

(g) Write a program to find if a square matrix is symmetric.

(h) Write a program to add two 6 x 6 matrices.

(i) Write a program to multiply any two 3 x 3 matrices.

(j) Given an array **p[5]**, write a function to shift it circularly left by two positions. Thus, if p[0] = 15, p[1]= 30, p[2] = 28, p[3]= 19 and p[4] = 61 then after the shift p[0] = 28, p[1] = 19, p[2] = 61, p[3] = 15 and p[4] = 30. Call this function for a (4 x 5) matrix and get its rows left shifted.

(k) A 6 x 6 matrix is entered through the keyboard. Write a program to obtain the Determinant value of this matrix.

(l) For the following set of sample data, compute the standard deviation and the mean.

-6, -12, 8, 13, 11, 6, 7, 2, -6, -9, -10, 11, 10, 9, 2

The formula for standard deviation is

$$\frac{\sqrt{(x_i - \bar{x})^2}}{n}$$

where x_i is the data item and $\bar{x}$ is the mean.

(m) The area of a triangle can be computed by the sine law when 2 sides of the triangle and the angle between them are known.

Area = (1 / 2) ab sin (angle)

Given the following 6 triangular pieces of land, write a program to find their area and determine which is largest.

Plot No.	a	b	angle
1	137.4	80.9	0.78
2	155.2	92.62	0.89
3	149.3	97.93	1.35
4	160.0	100.25	9.00
5	155.6	68.95	1.25
6	149.7	120.0	1.75

(n) For the following set of **n** data points (x, y), write a program to compute the correlation coefficient r, given by

$$r = \frac{\sum xy - \sum x \sum y}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

x	y
34.22	102.43
39.87	100.93
41.85	97.43
43.23	97.81
40.06	98.32
53.29	98.32
53.29	100.07
54.14	97.08
49.12	91.59
40.71	94.85
55.15	94.65

(o) For the following set of point given by **(x, y)** fit a straight line given by $y = a + bx$

where,

$a = \bar{y} - b\bar{x}$ and

$$b = \frac{n\sum yx - \sum x \sum y}{[n\sum x^2 - (\sum x)^2]}$$

x	Y
3.0	1.5
4.5	2.0
5.5	3.5
6.5	5.0
7.5	6.0
8.5	7.5
8.0	9.0
9.0	10.5
9.5	12.0
10.0	14.0

(p) The **X** and **Y** coordinates of 10 different points are entered through the keyboard. Write a program to find the distance of last point from the first point (sum of distances between consecutive points).

(q) A dequeue is an ordered set of elements in which elements may be inserted or retrieved from either end. Using an array simulate a dequeue of characters and the operations retrieve left, retrieve right, insert left, insert right. Exceptional conditions such as dequeue full or empty should be indicated. Two pointers (namely, left and right) are needed in this simulation.