

question_1

In [27]: *# Method first*

```
number <- c(1:60)
print(number)
```

```
[1] 1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
[26] 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
[51] 51 52 53 54 55 56 57 58 59 60
```

In [28]:

```
dim_arr <- array(number,dim = c(5,4,3))
print(dim_arr)
```

, , 1

	[,1]	[,2]	[,3]	[,4]
[1,]	1	6	11	16
[2,]	2	7	12	17
[3,]	3	8	13	18
[4,]	4	9	14	19
[5,]	5	10	15	20

, , 2

	[,1]	[,2]	[,3]	[,4]
[1,]	21	26	31	36
[2,]	22	27	32	37
[3,]	23	28	33	38
[4,]	24	29	34	39
[5,]	25	30	35	40

, , 3

	[,1]	[,2]	[,3]	[,4]
[1,]	41	46	51	56
[2,]	42	47	52	57
[3,]	43	48	53	58
[4,]	44	49	54	59
[5,]	45	50	55	60

```
In [29]: # Method second of first question
```

```
q <- c(1:60)
```

```
dim(q) <- c(5,4,3)
```

```
print(q)
```

```
, , 1
```

	[,1]	[,2]	[,3]	[,4]
[1,]	1	6	11	16
[2,]	2	7	12	17
[3,]	3	8	13	18
[4,]	4	9	14	19
[5,]	5	10	15	20

```
, , 2
```

	[,1]	[,2]	[,3]	[,4]
[1,]	21	26	31	36
[2,]	22	27	32	37
[3,]	23	28	33	38
[4,]	24	29	34	39
[5,]	25	30	35	40

```
, , 3
```

	[,1]	[,2]	[,3]	[,4]
[1,]	41	46	51	56
[2,]	42	47	52	57
[3,]	43	48	53	58
[4,]	44	49	54	59
[5,]	45	50	55	60

question_2

```
In [30]: vec <- c(1:100)
arr1 <- array(vec , dim= c(6,6,4))
print(arr1)
```

```
, , 1
```

```
      [,1] [,2] [,3] [,4] [,5] [,6]
[1,]    1    7   13   19   25   31
[2,]    2    8   14   20   26   32
[3,]    3    9   15   21   27   33
[4,]    4   10   16   22   28   34
[5,]    5   11   17   23   29   35
[6,]    6   12   18   24   30   36
```

```
, , 2
```

```
      [,1] [,2] [,3] [,4] [,5] [,6]
[1,]   37   43   49   55   61   67
[2,]   38   44   50   56   62   68
[3,]   39   45   51   57   63   69
[4,]   40   46   52   58   64   70
[5,]   41   47   53   59   65   71
[6,]   42   48   54   60   66   72
```

```
, , 3
```

```
      [,1] [,2] [,3] [,4] [,5] [,6]
[1,]   73   79   85   91   97    3
[2,]   74   80   86   92   98    4
[3,]   75   81   87   93   99    5
[4,]   76   82   88   94  100    6
[5,]   77   83   89   95    1    7
[6,]   78   84   90   96    2    8
```

```
, , 4
```

```
      [,1] [,2] [,3] [,4] [,5] [,6]
[1,]    9   15   21   27   33   39
[2,]   10   16   22   28   34   40
[3,]   11   17   23   29   35   41
[4,]   12   18   24   30   36   42
[5,]   13   19   25   31   37   43
[6,]   14   20   26   32   38   44
```

```
In [40]: m0 = matrix(10:200 , nrow = 6 , ncol = 6)
m0
```

```
Warning message in matrix(10:200, nrow = 6, ncol = 6):
"data length [191] is not a sub-multiple or multiple of the number of rows [6]"
```

```
10 16 22 28 34 40
11 17 23 29 35 41
12 18 24 30 36 42
13 19 25 31 37 43
14 20 26 32 38 44
15 21 27 33 39 45
```

question_3

```
In [32]: mat = matrix(number, nrow = 6, ncol = 6)
print(mat)
```

```
      [,1] [,2] [,3] [,4] [,5] [,6]
[1,]    1    7   13   19   25   31
[2,]    2    8   14   20   26   32
[3,]    3    9   15   21   27   33
[4,]    4   10   16   22   28   34
[5,]    5   11   17   23   29   35
[6,]    6   12   18   24   30   36
```

question_4

```
In [34]: vec1 = as.vector(mat)
print(vec1)
```

```
 [1]  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
[26] 26 27 28 29 30 31 32 33 34 35 36
```

question_5

```
In [21]: dim(v1)
```

```
NULL
```

```
In [35]: m=matrix(1:12,3,4)
print(m)
```

```
      [,1] [,2] [,3] [,4]
[1,]    1    4    7   10
[2,]    2    5    8   11
[3,]    3    6    9   12
```

```
In [46]: # changing name of rows with prefix 'rownum'
rownames(m)<- rownames(m, do.NULL = F, prefix = "rowname")
print(m)
```

```
      [,1] [,2] [,3] [,4]
rowname1    1    4    7   10
rowname2    2    5    8   11
rowname3    3    6    9   12
```

```
In [47]: colnames(m) <- c("level1","level2","level3","level4","level5","level6","level7")
print(m)
```

```
Error in dimnames(x) <- dn: length of 'dimnames' [2] not equal to array extent
Traceback:
```

```
1. `colnames<-`(`*tmp*`, value = c("level1", "level2", "level3",
. "level4", "level5", "level6", "level7"))
```

question_6

```
In [52]: m2 = matrix(data = rpois(100,48),nrow = 20, ncol = 5)
print(m2)
```

```
      [,1] [,2] [,3] [,4] [,5]
[1,]  56  54  52  40  36
[2,]  47  36  40  42  50
[3,]  48  56  38  45  33
[4,]  44  56  53  43  42
[5,]  49  42  53  47  47
[6,]  49  55  41  32  46
[7,]  37  48  59  47  44
[8,]  59  50  60  62  52
[9,]  48  35  42  44  57
[10,] 52  42  52  41  46
[11,] 57  51  38  48  57
[12,] 63  53  45  38  57
[13,] 50  40  56  47  59
[14,] 39  41  45  58  45
[15,] 58  43  40  52  44
[16,] 41  37  43  42  47
[17,] 48  43  46  53  49
[18,] 43  45  54  50  47
[19,] 42  45  42  50  38
[20,] 45  58  46  40  50
```

```
In [53]: colnames(m2)<- c('week1','week2','week3','week4','week5')
m2
```

	week1	week2	week3	week4	week5
56	54	52	40	36	
47	36	40	42	50	
48	56	38	45	33	
44	56	53	43	42	
49	42	53	47	47	
49	55	41	32	46	
37	48	59	47	44	
59	50	60	62	52	
48	35	42	44	57	
52	42	52	41	46	
57	51	38	48	57	
63	53	45	38	57	
50	40	56	47	59	
39	41	45	58	45	
58	43	40	52	44	
41	37	43	42	47	
48	43	46	53	49	
43	45	54	50	47	
42	45	42	50	38	
45	58	46	40	50	

```
In [59]: m3 <- rbind(m2,apply(m2,2,mean))
print(m3)
```

```
      week1 week2 week3 week4 week5
[1,] 56.00  54.0 52.00 40.00  36.0
[2,] 47.00  36.0 40.00 42.00  50.0
[3,] 48.00  56.0 38.00 45.00  33.0
[4,] 44.00  56.0 53.00 43.00  42.0
[5,] 49.00  42.0 53.00 47.00  47.0
[6,] 49.00  55.0 41.00 32.00  46.0
[7,] 37.00  48.0 59.00 47.00  44.0
[8,] 59.00  50.0 60.00 62.00  52.0
[9,] 48.00  35.0 42.00 44.00  57.0
[10,] 52.00  42.0 52.00 41.00  46.0
[11,] 57.00  51.0 38.00 48.00  57.0
[12,] 63.00  53.0 45.00 38.00  57.0
[13,] 50.00  40.0 56.00 47.00  59.0
[14,] 39.00  41.0 45.00 58.00  45.0
[15,] 58.00  43.0 40.00 52.00  44.0
[16,] 41.00  37.0 43.00 42.00  47.0
[17,] 48.00  43.0 46.00 53.00  49.0
[18,] 43.00  45.0 54.00 50.00  47.0
[19,] 42.00  45.0 42.00 50.00  38.0
[20,] 45.00  58.0 46.00 40.00  50.0
[21,] 48.75  46.5 47.25 46.05  47.3
```

```
In [60]: m4 <- cbind(m3,apply(m3,1,mean))
print(m4)
```

```
      week1 week2 week3 week4 week5
[1,] 56.00  54.0 52.00 40.00  36.0 47.60
[2,] 47.00  36.0 40.00 42.00  50.0 43.00
[3,] 48.00  56.0 38.00 45.00  33.0 44.00
[4,] 44.00  56.0 53.00 43.00  42.0 47.60
[5,] 49.00  42.0 53.00 47.00  47.0 47.60
[6,] 49.00  55.0 41.00 32.00  46.0 44.60
[7,] 37.00  48.0 59.00 47.00  44.0 47.00
[8,] 59.00  50.0 60.00 62.00  52.0 56.60
[9,] 48.00  35.0 42.00 44.00  57.0 45.20
[10,] 52.00  42.0 52.00 41.00  46.0 46.60
[11,] 57.00  51.0 38.00 48.00  57.0 50.20
[12,] 63.00  53.0 45.00 38.00  57.0 51.20
[13,] 50.00  40.0 56.00 47.00  59.0 50.40
[14,] 39.00  41.0 45.00 58.00  45.0 45.60
[15,] 58.00  43.0 40.00 52.00  44.0 47.40
[16,] 41.00  37.0 43.00 42.00  47.0 42.00
[17,] 48.00  43.0 46.00 53.00  49.0 47.80
[18,] 43.00  45.0 54.00 50.00  47.0 47.80
[19,] 42.00  45.0 42.00 50.00  38.0 43.40
[20,] 45.00  58.0 46.00 40.00  50.0 47.80
[21,] 48.75  46.5 47.25 46.05  47.3 47.17
```