



```
np.max(a)
```

```
65
```

```
np.argmax(a)
```

```
2
```

```
np.argmin(a)
```

```
4
```

```
np.min(a)
```

```
0
```

```
a=np.array([4,2,56,0,6,9,56])
```

```
a
```

```
array([ 4,  2, 56,  0,  6,  9, 56])
```

```
np.max(a)
```

```
56
```

```
np.argmax(a)
```

```
2
```

```
b=np.array([[23,2,54],[17,3,42],[15,5,65]])
```

```
b
```

```
array([[23,  2, 54],  
       [17,  3, 42],  
       [15,  5, 65]])
```

```
np.sort(b)
```

```
array([[ 2, 23, 54],  
       [ 3, 17, 42],  
       [ 5, 15, 65]])
```

```
np.sort(b,axis=0)
```

```
array([[15,  2, 42],
```

```
[17,  3, 54],
 [23,  5, 65]])
```

```
np.sort(b,axis=1)
```

```
array([[ 2, 23, 54],
       [ 3, 17, 42],
       [ 5, 15, 65]])
```

```
b
```

```
array([[23,  2, 54],
       [17,  3, 42],
       [15,  5, 65]])
```

```
np.sort(b,axis=0)
```

```
array([[15,  2, 42],
       [17,  3, 54],
       [23,  5, 65]])
```

```
np.argsort(b,axis=0)
```

```
array([[2, 0, 1],
       [1, 1, 0],
       [0, 2, 2]])
```

```
b
```

```
array([[23,  2, 54],
       [17,  3, 42],
       [15,  5, 65]])
```

```
np.sort(b,axis=1)
```

```
array([[ 2, 23, 54],
       [ 3, 17, 42],
       [ 5, 15, 65]])
```

```
np.argsort(b,axis=1)
```

```
array([[1, 0, 2],
       [1, 0, 2],
       [1, 0, 2]])
```

```
data=np.loadtxt("/Users/nikhilsanghi/Downloads/dsml-course-main-live/batches/May-Beg-Aug-A
```

```
data[:44]
```

```
array(['06-10-2017', '5464', '200', '181', '5', '0', '66'],
      ['07-10-2017', '6041', '100', '197', '8', '0', '66'],
```

```
[ '08-10-2017', '25', '100', '0', '5', '0', '66'],
[ '09-10-2017', '5461', '100', '174', '4', '0', '66'],
[ '10-10-2017', '6915', '200', '223', '5', '500', '66'],
[ '11-10-2017', '4545', '100', '149', '6', '0', '66'],
[ '12-10-2017', '4340', '100', '140', '6', '0', '66'],
[ '13-10-2017', '1230', '100', '38', '7', '0', '66'],
[ '14-10-2017', '61', '100', '1', '5', '0', '66'],
[ '15-10-2017', '1258', '100', '40', '6', '0', '65'],
[ '16-10-2017', '3148', '100', '101', '8', '0', '65'],
[ '17-10-2017', '4687', '100', '152', '5', '0', '65'],
[ '18-10-2017', '4732', '300', '150', '6', '500', '65'],
[ '19-10-2017', '3519', '100', '113', '7', '0', '65'],
[ '20-10-2017', '1580', '100', '49', '5', '0', '65'],
[ '21-10-2017', '2822', '100', '86', '6', '0', '65'],
[ '22-10-2017', '181', '100', '6', '8', '0', '65'],
[ '23-10-2017', '3158', '200', '99', '5', '0', '65'],
[ '24-10-2017', '4383', '200', '143', '4', '0', '64'],
[ '25-10-2017', '3881', '200', '125', '5', '0', '64'],
[ '26-10-2017', '4037', '200', '129', '6', '0', '64'],
[ '27-10-2017', '202', '200', '6', '8', '0', '64'],
[ '28-10-2017', '292', '200', '9', '5', '0', '64'],
[ '29-10-2017', '330', '300', '10', '6', '0', '64'],
[ '30-10-2017', '2209', '200', '72', '5', '0', '64'],
[ '31-10-2017', '4550', '300', '150', '8', '500', '64'],
[ '01-11-2017', '4435', '300', '141', '5', '0', '64'],
[ '02-11-2017', '4779', '300', '156', '4', '0', '64'],
[ '03-11-2017', '1831', '300', '57', '5', '0', '64'],
[ '04-11-2017', '2255', '300', '72', '4', '0', '64'],
[ '05-11-2017', '539', '300', '17', '5', '500', '64'],
[ '06-11-2017', '5464', '300', '181', '4', '0', '64'],
[ '07-11-2017', '6041', '200', '197', '3', '0', '64'],
[ '08-11-2017', '4068', '300', '131', '2', '0', '64'],
[ '09-11-2017', '4683', '300', '154', '9', '0', '64'],
[ '10-11-2017', '4033', '300', '137', '5', '0', '64'],
[ '11-11-2017', '6314', '300', '193', '6', '500', '64'],
[ '12-11-2017', '614', '300', '19', '4', '500', '64'],
[ '13-11-2017', '3149', '300', '101', '5', '500', '64'],
[ '14-11-2017', '4005', '300', '139', '8', '500', '64'],
[ '15-11-2017', '4880', '300', '164', '4', '500', '64'],
[ '16-11-2017', '4136', '300', '137', '5', '500', '64'],
[ '17-11-2017', '705', '300', '22', '6', '500', '64'],
[ '18-11-2017', '570', '200', '17', '5', '500', '64']], dtype='<U10')
```

data.shape

(96, 7)

data[0]

array(['06-10-2017', '5464', '200', '181', '5', '0', '66'], dtype='<U10')

data.T

```
array(['06-10-2017', '07-10-2017', '08-10-2017', '09-10-2017',
      '10-10-2017', '11-10-2017', '12-10-2017', '13-10-2017',
      '14-10-2017', '15-10-2017', '16-10-2017', '17-10-2017',
      '18-10-2017', '19-10-2017', '20-10-2017', '21-10-2017',
```

```

'22-10-2017', '23-10-2017', '24-10-2017', '25-10-2017',
'26-10-2017', '27-10-2017', '28-10-2017', '29-10-2017',
'30-10-2017', '31-10-2017', '01-11-2017', '02-11-2017',
'03-11-2017', '04-11-2017', '05-11-2017', '06-11-2017',
'07-11-2017', '08-11-2017', '09-11-2017', '10-11-2017',
'11-11-2017', '12-11-2017', '13-11-2017', '14-11-2017',
'15-11-2017', '16-11-2017', '17-11-2017', '18-11-2017',
'19-11-2017', '20-11-2017', '21-11-2017', '22-11-2017',
'23-11-2017', '24-11-2017', '25-11-2017', '26-11-2017',
'27-11-2017', '28-11-2017', '29-11-2017', '30-11-2017',
'01-12-2017', '02-12-2017', '03-12-2017', '04-12-2017',
'05-12-2017', '06-12-2017', '07-12-2017', '08-12-2017',
'09-12-2017', '10-12-2017', '11-12-2017', '12-12-2017',
'13-12-2017', '14-12-2017', '15-12-2017', '16-12-2017',
'17-12-2017', '18-12-2017', '19-12-2017', '20-12-2017',
'21-12-2017', '22-12-2017', '23-12-2017', '24-12-2017',
'25-12-2017', '26-12-2017', '27-12-2017', '28-12-2017',
'29-12-2017', '30-12-2017', '31-12-2017', '01-01-2018',
'02-01-2018', '03-01-2018', '04-01-2018', '05-01-2018',
'06-01-2018', '07-01-2018', '08-01-2018', '09-01-2018'],
['5464', '6041', '25', '5461', '6915', '4545', '4340', '1230',
'61', '1258', '3148', '4687', '4732', '3519', '1580', '2822',
'181', '3158', '4383', '3881', '4037', '202', '292', '330',
'2209', '4550', '4435', '4779', '1831', '2255', '539', '5464',
'6041', '4068', '4683', '4033', '6314', '614', '3149', '4005',
'4880', '4136', '705', '570', '269', '4275', '5999', '4421',
'6930', '5195', '546', '493', '995', '1163', '6676', '3608',
'774', '1421', '4064', '2725', '5934', '1867', '3721', '2374',
'2909', '1648', '799', '7102', '3941', '7422', '437', '1231',
'1696', '4921', '221', '6500', '3575', '4061', '651', '753',
'518', '5537', '4108', '5376', '3066', '177', '36', '299',
'1447', '2599', '702', '133', '153', '500', '2127', '2203'],
['200', '100', '100', '100', '200', '100', '100', '100', '100',
'100', '100', '100', '300', '100', '100', '100', '100', '200',
'200', '200', '200', '200', '200', '300', '200', '300', '300',
'300', '300', '300', '300', '300', '200', '300', '300', '300',
'300', '300', '300', '300', '300', '300', '300', '200', '300',
'300', '300', '300', '300', '300', '300', '300', '300', '200',
'100', '300', '300', '300', '300', '300', '300', '300', '100',
'200', '200', '100', '100', '200', '200', '300', '200', '200',
'100', '200', '100', '200', '200', '100', '100', '100', '100',
'300', '200', '300', '200', '100', '100', '100', '200', '200',
'100', '100', '300', '200', '200', '300'],
['181', '197', '0', '174', '223', '149', '140', '38', '1', '40',
'101', '152', '150', '113', '49', '86', '6', '99', '143', '125',
'129', '6', '9', '10', '72', '150', '141', '156', '57', '72',
'17', '181', '197', '131', '154', '137', '193', '19', '101',
'139', '164', '137', '22', '17', '9', '145', '192', '146', '234',
'167', '16', '17', '32', '35', '220', '116', '23', '44', '131',
'86', '194', '60', '121', '76', '93', '53', '25', '227', '125',
'243', '14', '39', '55', '158', '7', '213', '116', '129', '21',
'28', '16', '180', '138', '176', '99', '5', '1', '10', '47',
'84', '23', '4', '0', '0', '0', '0'],
['5', '8', '5', '4', '5', '6', '6', '7', '5', '6', '8', '5', '6',

```

```

# date,step_count,mood,calories_burned,
# hours_of_sleep,bool_of_active,weight_kg

```

```
data1=np.array([[1,2,3]])
```

```
print(data1)
```

```
[[1 2 3]]
```

```
data1.T
```

```
array([[1],  
       [2],  
       [3]])
```

```
data1.shape
```

```
(3, 1)
```

```
a,b,c=data1.T
```

```
a
```

```
array([1])
```

```
b
```

```
array([2])
```

```
c
```

```
array([3])
```

```
date,step_count,mood,calories_burned,hours_of_sleep,bool_of_active,weight_kg=data.T
```

```
date
```

```
array(['06-10-2017', '07-10-2017', '08-10-2017', '09-10-2017',  
      '10-10-2017', '11-10-2017', '12-10-2017', '13-10-2017',  
      '14-10-2017', '15-10-2017', '16-10-2017', '17-10-2017',  
      '18-10-2017', '19-10-2017', '20-10-2017', '21-10-2017',  
      '22-10-2017', '23-10-2017', '24-10-2017', '25-10-2017',  
      '26-10-2017', '27-10-2017', '28-10-2017', '29-10-2017',  
      '30-10-2017', '31-10-2017', '01-11-2017', '02-11-2017',  
      '03-11-2017', '04-11-2017', '05-11-2017', '06-11-2017',  
      '07-11-2017', '08-11-2017', '09-11-2017', '10-11-2017',  
      '11-11-2017', '12-11-2017', '13-11-2017', '14-11-2017',  
      '15-11-2017', '16-11-2017', '17-11-2017', '18-11-2017',  
      '19-11-2017', '20-11-2017', '21-11-2017', '22-11-2017',  
      '23-11-2017', '24-11-2017', '25-11-2017', '26-11-2017',  
      '27-11-2017', '28-11-2017', '29-11-2017', '30-11-2017',  
      '01-12-2017', '02-12-2017', '03-12-2017', '04-12-2017',  
      '05-12-2017', '06-12-2017', '07-12-2017', '08-12-2017',  
      '09-12-2017', '10-12-2017', '11-12-2017', '12-12-2017',  
      '13-12-2017', '14-12-2017', '15-12-2017', '16-12-2017',  
      '17-12-2017', '18-12-2017', '19-12-2017', '20-12-2017',  
      '21-12-2017', '22-12-2017', '23-12-2017', '24-12-2017',
```

```
'25-12-2017', '26-12-2017', '27-12-2017', '28-12-2017',
'29-12-2017', '30-12-2017', '31-12-2017', '01-01-2018',
'02-01-2018', '03-01-2018', '04-01-2018', '05-01-2018',
'06-01-2018', '07-01-2018', '08-01-2018', '09-01-2018'],
dtype='<U10')
```

```
date=data[:,0]
step_count=data[:,1]
mood=data[:,2]
```

```
step_count.dtype
```

```
dtype('<U10')
```

```
step_count=np.array(step_count,dtype="int")
step_count.dtype
```

```
dtype('int64')
```

```
step_count
```

```
array([5464, 6041, 25, 5461, 6915, 4545, 4340, 1230, 61, 1258, 3148,
4687, 4732, 3519, 1580, 2822, 181, 3158, 4383, 3881, 4037, 202,
292, 330, 2209, 4550, 4435, 4779, 1831, 2255, 539, 5464, 6041,
4068, 4683, 4033, 6314, 614, 3149, 4005, 4880, 4136, 705, 570,
269, 4275, 5999, 4421, 6930, 5195, 546, 493, 995, 1163, 6676,
3608, 774, 1421, 4064, 2725, 5934, 1867, 3721, 2374, 2909, 1648,
799, 7102, 3941, 7422, 437, 1231, 1696, 4921, 221, 6500, 3575,
4061, 651, 753, 518, 5537, 4108, 5376, 3066, 177, 36, 299,
1447, 2599, 702, 133, 153, 500, 2127, 2203])
```

```
np.mean(step_count)
```

```
2935.9375
```

```
calories_burned=np.array(calories_burned,dtype="int")
calories_burned[:5]
```

```
array([181, 197, 0, 174, 223])
```

```
hours_of_sleep=np.array(hours_of_sleep,dtype="int")
hours_of_sleep[:5]
```

```
array([5, 8, 5, 4, 5])
```

```
weight_kg=np.array(weight_kg,dtype="int")
weight_kg[:5]
```

```
array([66, 66, 66, 66, 66])
```

mood

```
array(['200', '100', '100', '100', '200', '100', '100', '100', '100',
      '100', '100', '100', '300', '100', '100', '100', '100', '200',
      '200', '200', '200', '200', '200', '300', '200', '300', '300',
      '300', '300', '300', '300', '300', '200', '300', '300', '300',
      '300', '300', '300', '300', '300', '300', '300', '200', '300',
      '300', '300', '300', '300', '300', '300', '300', '300', '200',
      '100', '300', '300', '300', '300', '300', '300', '300', '100',
      '200', '200', '100', '100', '200', '200', '300', '200', '200',
      '100', '200', '100', '200', '200', '100', '100', '100', '100',
      '300', '200', '300', '200', '100', '100', '100', '200', '200',
      '100', '100', '300', '200', '200', '300'], dtype='<U10')
```

```
mood[mood=='100']="sad"
```

mood

```
array(['200', 'sad', 'sad', 'sad', '200', 'sad', 'sad', 'sad', 'sad',
      'sad', 'sad', 'sad', '300', 'sad', 'sad', 'sad', 'sad', '200',
      '200', '200', '200', '200', '300', '200', '300', '300',
      '300', '300', '300', '300', '300', '200', '300', '300', '300',
      '300', '300', '300', '300', '300', '300', '300', '200', '300',
      'sad', '300', '300', '300', '300', '300', '300', '300', 'sad',
      '200', '200', 'sad', 'sad', '200', '200', '300', '200', '200',
      'sad', '200', 'sad', '200', '200', 'sad', 'sad', 'sad', 'sad',
      '300', '200', '300', '200', 'sad', 'sad', 'sad', '200', '200',
      'sad', 'sad', '300', '200', '200', '300'], dtype='<U10')
```

```
mood[mood=='200']="neutral"
```

```
mood[mood=='300']="happy"
```

mood

```
array(['neutral', 'sad', 'sad', 'sad', 'neutral', 'sad', 'sad', 'sad',
      'sad', 'sad', 'sad', 'sad', 'happy', 'sad', 'sad', 'sad', 'sad',
      'neutral', 'neutral', 'neutral', 'neutral', 'neutral', 'neutral',
      'happy', 'neutral', 'happy', 'happy', 'happy', 'happy', 'happy',
      'happy', 'happy', 'neutral', 'happy', 'happy', 'happy', 'happy',
      'happy', 'happy', 'happy', 'happy', 'happy', 'happy', 'neutral',
      'happy', 'happy', 'happy', 'happy', 'happy', 'happy', 'happy',
      'happy', 'happy', 'neutral', 'sad', 'happy', 'happy', 'happy',
      'happy', 'happy', 'happy', 'happy', 'sad', 'neutral', 'neutral',
      'sad', 'sad', 'neutral', 'neutral', 'happy', 'neutral', 'neutral',
      'sad', 'neutral', 'sad', 'neutral', 'neutral', 'sad', 'sad', 'sad',
      'sad', 'happy', 'neutral', 'happy', 'neutral', 'sad', 'sad', 'sad',
      'neutral', 'neutral', 'sad', 'sad', 'happy', 'neutral', 'neutral',
      'happy'], dtype='<U10')
```

```
bool_of_active[bool_of_active=="0"]="inactive"
```

```
bool_of_active[bool_of_active=="500"]="active"
```


bool_of_active

```
array(['inactive', 'inactive', 'inactive', 'inactive', 'active',
      'inactive', 'inactive', 'inactive', 'inactive', 'inactive',
      'inactive', 'inactive', 'active', 'inactive', 'inactive',
      'inactive', 'inactive', 'inactive', 'inactive', 'inactive',
      'inactive', 'inactive', 'inactive', 'inactive', 'inactive',
      'active', 'inactive', 'inactive', 'inactive', 'inactive', 'active',
      'inactive', 'inactive', 'inactive', 'inactive', 'inactive',
      'active', 'active', 'active', 'active', 'active', 'active',
      'active', 'active', 'active', 'inactive', 'inactive', 'inactive',
      'inactive', 'inactive', 'inactive', 'active', 'active', 'active',
      'active', 'active', 'active', 'active', 'active', 'active',
      'active', 'active', 'active', 'inactive', 'active', 'active',
      'inactive', 'active', 'active', 'active', 'active', 'active',
      'inactive', 'active', 'active', 'active', 'active', 'inactive',
      'inactive', 'inactive', 'inactive', 'active', 'active', 'active',
      'active', 'inactive', 'inactive', 'inactive', 'inactive',
      'inactive', 'inactive', 'inactive', 'inactive', 'active',
      'inactive', 'active'], dtype='<U10')
```

np.unique(mood)

```
array(['happy', 'neutral', 'sad'], dtype='<U10')
```

np.unique(mood,return_counts=True)

```
(array(['happy', 'neutral', 'sad'], dtype='<U10'), array([40, 27, 29]))
```

np.unique?

np.mean(step_count)

```
2935.9375
```

np.max(step_count)

```
7422
```

np.argmax(step_count)

```
69
```

date[np.argmax(step_count)]

```
'14-12-2017'
```

calories_burned[np.argmax(step_count)]

```
243
```

```
np.unique(mood[step_count>4000],return_counts=True)

(array(['happy', 'neutral', 'sad'], dtype='<U10'), array([22, 9, 7]))
```

```
np.mean(hours_of_sleep)

5.21875
```

```
z=np.unique(mood[step_count>4000],return_counts=True)
```

```
z[0][0]

'happy'
```

```
z[1]

array([22, 9, 7])
```

```
np.unique(mood[hours_of_sleep<4],return_counts=True)

(array(['happy', 'neutral', 'sad'], dtype='<U10'), array([1, 5, 6]))
```

```
np.unique(bool_of_active[hours_of_sleep>5],return_counts=True)

(array(['active', 'inactive'], dtype='<U10'), array([16, 17]))
```

```
weight_kg

array([66, 66, 66, 66, 66, 66, 66, 66, 66, 65, 65, 65, 65, 65, 65, 65, 65,
       65, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64,
       64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64,
       64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64,
       64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64,
       64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64, 64])
```

```
arr = np.array([-3,4,27,34,-2, 0, -45,-11,4, 0 ])
arr

array([ -3,  4, 27, 34, -2,  0, -45, -11,  4,  0])
```

```
arr[arr>0]=1
arr[arr<0]=-1
```

```
arr
```

```
array([ -3,   4,  27,  34,  -2,   0, -45, -11,   4,   0])
```

```
arr1=np.where(arr>0,"1","-1")
```

```
np.where?
```

```
arr
```

```
array([ -3,   4,  27,  34,  -2,   0, -45, -11,   4,   0])
```

```
arr1
```

```
array(['-1', '1', '1', '1', '-1', '-1', '-1', '-1', '1', '-1'],  
      dtype='<U2')
```

```
# 1.numpy.dot
```

```
# 2.numpy.matmul
```

```
# 3.@
```

```
a=np.arange(1,10).reshape((3,3))
```

```
a
```

```
array([[1, 2, 3],  
       [4, 5, 6],  
       [7, 8, 9]])
```

```
b=np.arange(2,11).reshape((3,3))
```

```
b
```

```
array([[ 2,  3,  4],  
       [ 5,  6,  7],  
       [ 8,  9, 10]])
```

```
np.matmul(a,b)
```

```
array([[ 36,  42,  48],  
       [ 81,  96, 111],  
       [126, 150, 174]])
```

```
np.matmul(b,a)
```

```
array([[ 42,  51,  60],  
       [ 78,  96, 114],  
       [114, 141, 168]])
```

a@b

```
array([[ 36,  42,  48],
       [ 81,  96, 111],
       [126, 150, 174]])
```

b@a

```
array([[ 42,  51,  60],
       [ 78,  96, 114],
       [114, 141, 168]])
```

np.dot(a,b)

```
array([[ 36,  42,  48],
       [ 81,  96, 111],
       [126, 150, 174]])
```

np.dot(b,a)

```
array([[ 42,  51,  60],
       [ 78,  96, 114],
       [114, 141, 168]])
```

np.dot(4,5)

20

np.matmul(4,5)

```
-----
ValueError                                Traceback (most recent call last)
/var/folders/hd/9z4dczb56dj541b7q8w7s4zw0000gn/T/ipykernel_1559/4235031990.py in
<module>
----> 1 np.matmul(4,5)
```

ValueError: matmul: Input operand 0 does not have enough dimensions (has 0, gufunc core with signature (n?,k),(k,m?)->(n?,m?) requires 1)

d=np.arange(1,5)

e=np.arange(2,6)

print(d)

print(e)

```
[1 2 3 4]
[2 3 4 5]
```

np.dot(d,e)

40

```
np.matmul(d,e)
```

```
40
```

```
d*e
```

```
array([ 2,  6, 12, 20])
```

```
d@e
```

```
40
```

```
g=np.arange(1,13).reshape((3,4))
```

```
g
```

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

```
h=np.arange(1,13).reshape((4,3))
```

```
h
```

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

```
np.dot(g,h)
```

```
array([[ 70,  80,  90],
       [158, 184, 210],
       [246, 288, 330]])
```

```
np.dot(h,g)
```

```
array([[ 38,  44,  50,  56],
       [ 83,  98, 113, 128],
       [128, 152, 176, 200],
       [173, 206, 239, 272]])
```

```
j=np.arange(1,4).reshape((1,3))
```

```
j
```

```
array([[1, 2, 3]])
```

```
h=np.arange(1,16).reshape((3,5))
```

```
h
```

```
array([[ 1,  2,  3,  4,  5],
       [ 6,  7,  8,  9, 10],
       [11, 12, 13, 14, 15]])
```

```
np.dot(j,h)
```

```
array([[46, 52, 58, 64, 70]])
```

```
np.dot(h,j)
```

```
-----
ValueError                                Traceback (most recent call last)
/var/folders/hd/9z4dczb56dj54lb7q8w7s4zw0000gn/T/ipykernel_1559/2566753132.py in
<module>
----> 1 np.dot(h,j)

<__array_function__ internals> in dot(*args, **kwargs)

ValueError: shapes (3,5) and (1,3) not aligned: 5 (dim 1) != 1 (dim 0)
```

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```
h=np.arange(1,16).reshape((5,3))
h
```

```
array([[ 1,  2,  3],
       [ 4,  5,  6],
       [ 7,  8,  9],
       [10, 11, 12],
       [13, 14, 15]])
```

```
h
```

```
array([[ 1,  2,  3],
       [ 4,  5,  6],
       [ 7,  8,  9],
       [10, 11, 12],
       [13, 14, 15]])
```

```
j.shape
```

```
(1, 3)
```

```
np.dot(j,h.T)
```

```
array([[14, 32, 50, 68, 86]])
```

```
# np.tile()
```

```
t=np.arange(1,13).reshape((3,4))
t
```

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

```
np.tile(t,(2,2))
```

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

```
np.tile(t,(3,2))
```

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

```
a = np.array([[23,4,43],
              [12,89,3],
              [69,420,0]])
```

```
b = np.sort(a)
```

```
b
```

```
array([[ 4, 23, 43],
       [ 3, 12, 89],
       [ 0, 69, 420]])
```

How can you create a 2D NumPy array mentioned below?

```
[[5.,5.,5.],
 [5.,5.,5.],
 [5.,5.,5.]]
```

```
a= np.identity(5)
```

```
a
```

```
array([[1., 0., 0., 0., 0.],
       [0., 1., 0., 0., 0.],
       [0., 0., 1., 0., 0.],
```

```
[0., 0., 0., 1., 0.],
 [0., 0., 0., 0., 1.]])
```

```
a= np.full((3,3),5.0)
print(a)
```

```
[[5. 5. 5.]
 [5. 5. 5.]
 [5. 5. 5.]]
```

```
a= np.ones((3,3))
print(a)
a=a+5
print(a)
```

```
[[1. 1. 1.]
 [1. 1. 1.]
 [1. 1. 1.]]
[[6. 6. 6.]
 [6. 6. 6.]
 [6. 6. 6.]]
```

```
a=np.zeros((3,3))
a=a*5
```

```
a=np.arange(1,10).reshape((3,3))
```

```
a
```

```
array([[1, 2, 3],
       [4, 5, 6],
       [7, 8, 9]])
```

```
print(np.max(a, axis=0))
```

```
[7 8 9]
```

```
a = np.array([1,2,3,4,5])
b = np.array([8,7,6])
a[2:] = b[::-1]
a
```

```
array([1, 2, 6, 7, 8])
```

```
# [1,2,6,7,8]
```

```
# [1,2,8,7,6]
```

```
# [1,2,3,4,5,8,7,6]
```



```
a = np.array([0,2,3])  
b = np.array([1,3,5])
```

```
a >= b
```

```
array([False, False, False])
```

dog.jpeg

```
np.argsort([[23, 2, 54]], axis = 0)
```

```
a=np.array([[2,87,1,0,99]])  
np.sort(a,axis=0)
```

```
array([[ 2, 87,  1,  0, 99]])
```

```
np.argsort(a,axis=0)
```

```
array([[0, 0, 0, 0, 0]])
```

```
np.sort(a,axis=1)
```

```
array([[ 0,  1,  2, 87, 99]])
```

```
np.argsort(a,axis=1)
```

```
array([[3, 2, 0, 1, 4]])
```

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