What are Tensors

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টেনসর 2টা

2 - 0D Tensor/Scalar

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(2) (3)

Scalars → 0D Tensor 0

0D tensor হচ্ছে zero 0 Dimension এর tensor যাকে n- dimensional array.

codes

```
import numpy as np
a=np.array(4)
```

a → output: array(4)

a.ndim → output: 0 [as এরাের 0 dimensional array হয়েছে]

1D Tensor/Vector

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[1, 2, 3, 4] → 1D Tensor → nDim → 1

↳ vector

↳ 1D array / array

1D Tensor / Vector ↳ 4D → এই 4 টা element

Axis

2 Dim

↳ No. of axes = rank = dim

[1, 2] → vector (2)
↳ 1D Tensor

[0, 1, 2, 3]

4 scalars → vector

1 D tensor means 1 D Array / Vector.

axis: simply means how many dimension in our data type.

Number of axis কে rank or dimension বলে।

code: INPUT

```
import numpy as np
d = np.array([1,2,3,4,5,6])
print(d)
print(d.ndim)
```

Output:

```
array([1,2,3,4,5,6])
dimension: 1
```

1D tensor কে vector বলে। আবার যদি উপরের code এ Vector এর Dimension কত জানতে চাই হবে → 6, কারন 6 টা element.

1 D tensor অনেকগুলো 0D tensor/scaler দিয়ে গঠিত।

2D " " 1D tensor " "

3D " " 2D " " "

2D Tensor/Matrices

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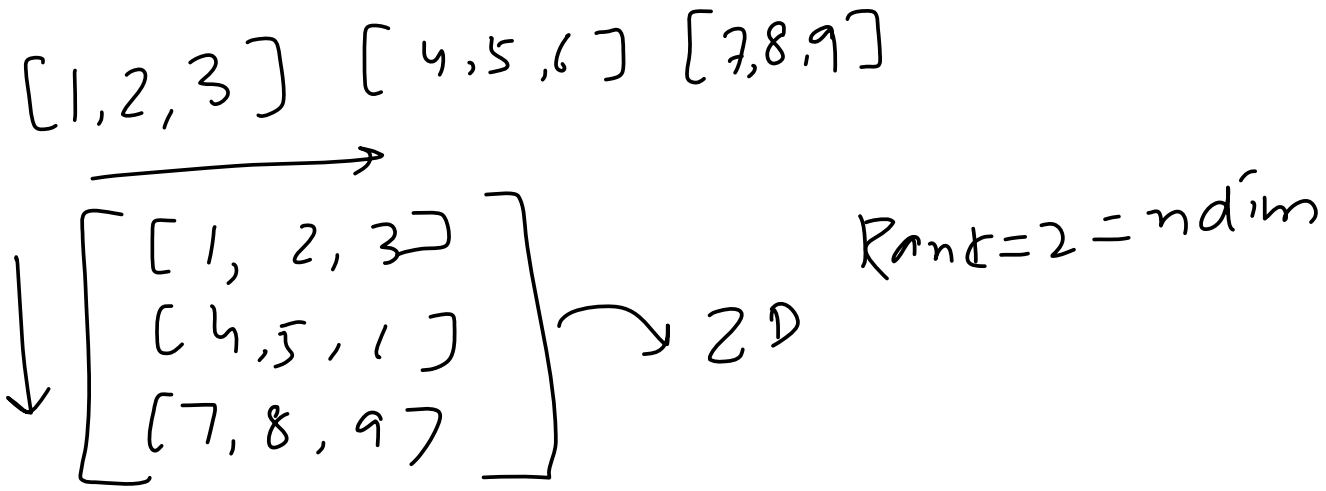
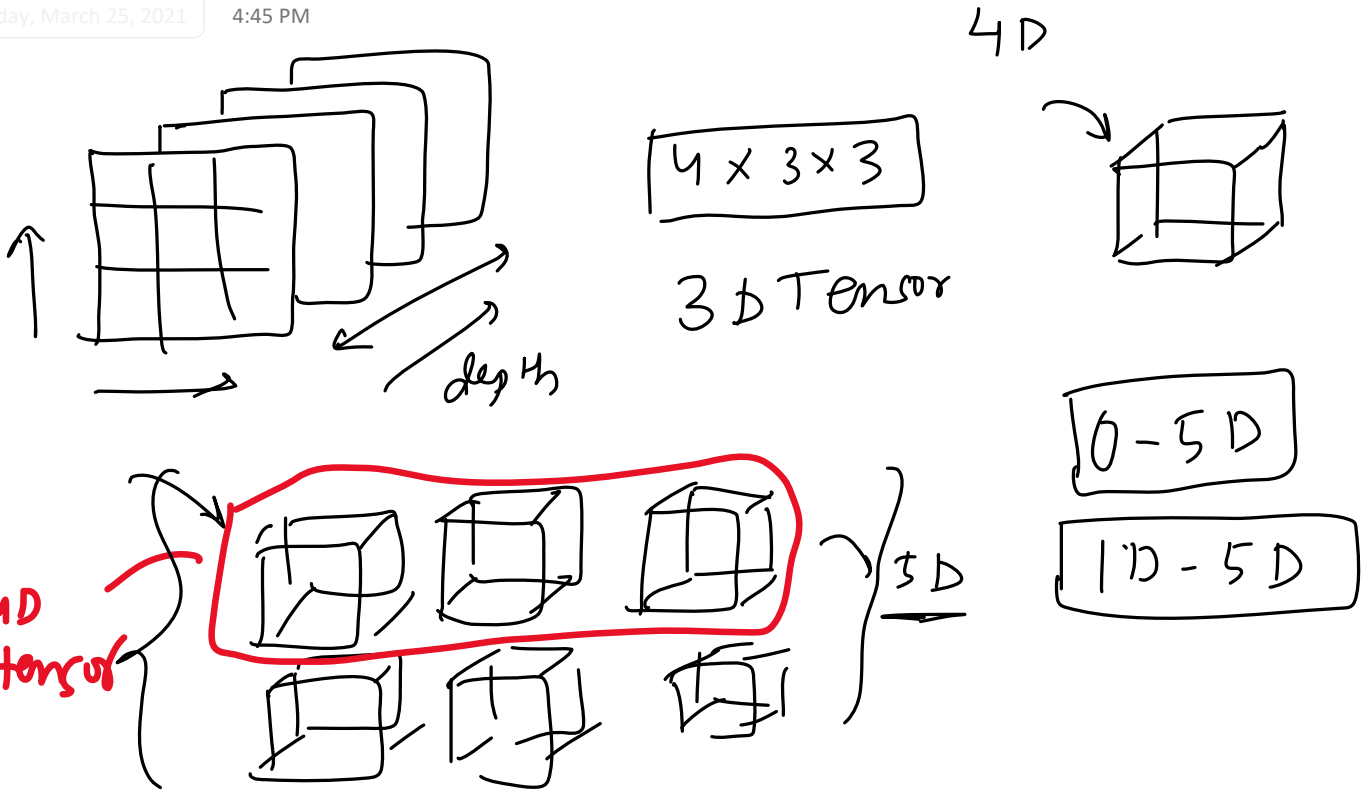


Code: Input

```
import numpy as np
d = np.array([[1,2,3],[4,5,6],
[7,8,9]])
print(d)
print(type(d))
print(d.ndim)
```

Output:

```
[[1 2 3]
 [4 5 6]
 [7 8 9]]
<class 'numpy.ndarray'>
2
```



Normally ব্যবহারিক ক্ষেত্রে (0D - 5D) এই ধরনের datatype ব্যবহার হয়। এগুলো ব্যবহার এই Related Exercise চেষ্টা

Rank, Axes and Shape

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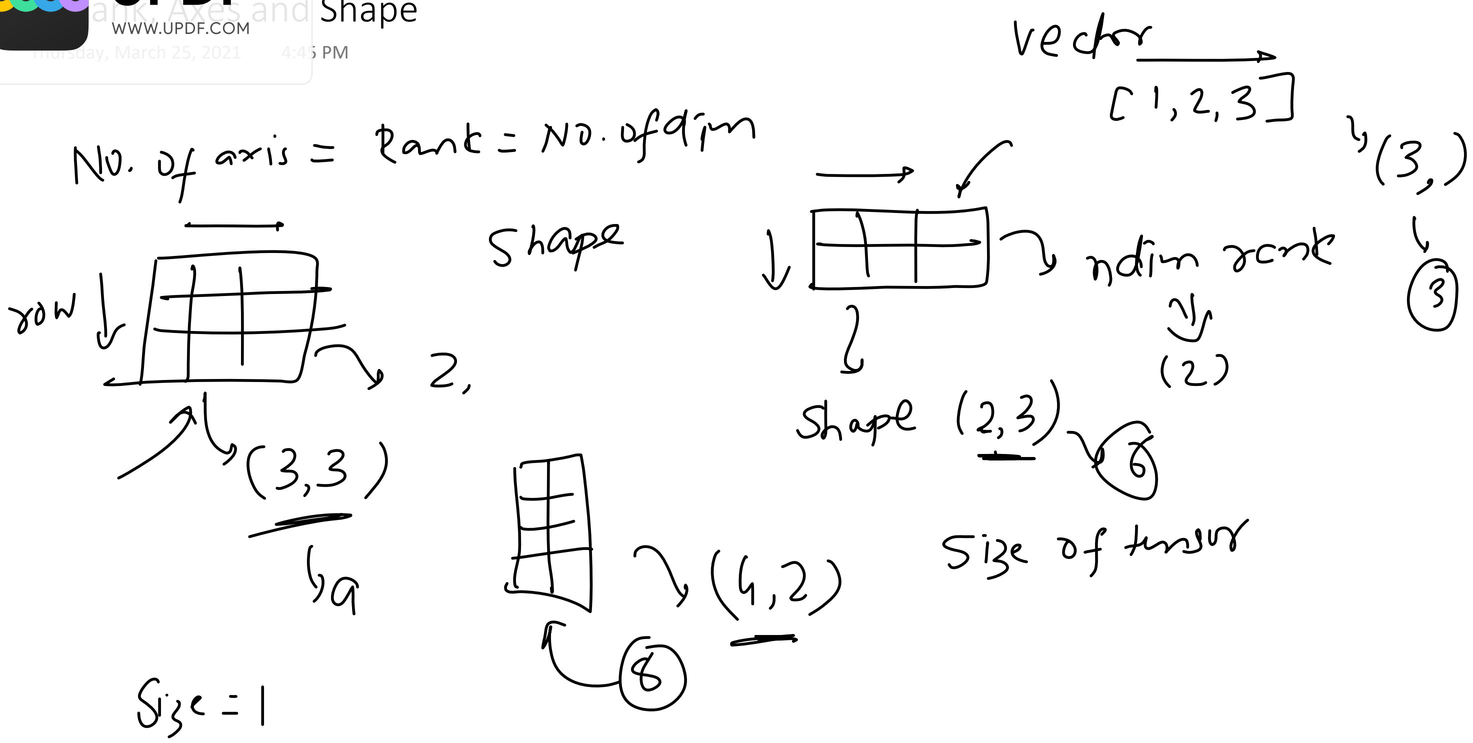
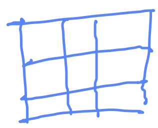


* Rank এবং Axes = No of dimension.

* প্রথমে shape হবে Matrix এর আকার।



* size হবে shape এর product. যেমন
size হবে 3x3 = 9.

Example of 1D Tensors

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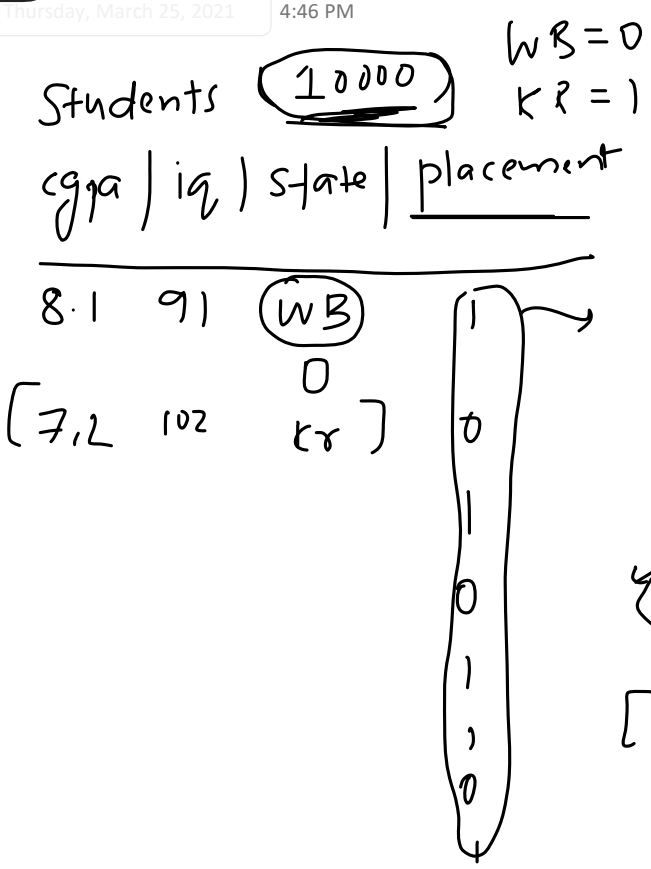

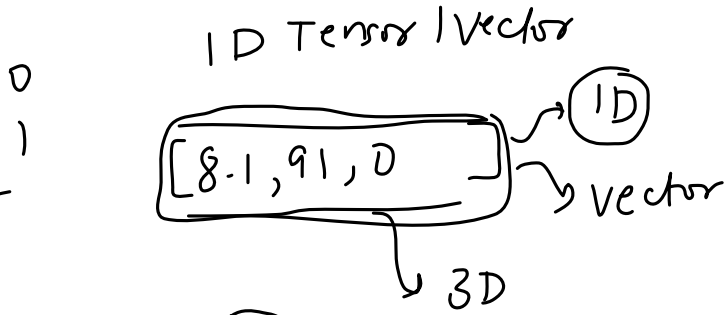

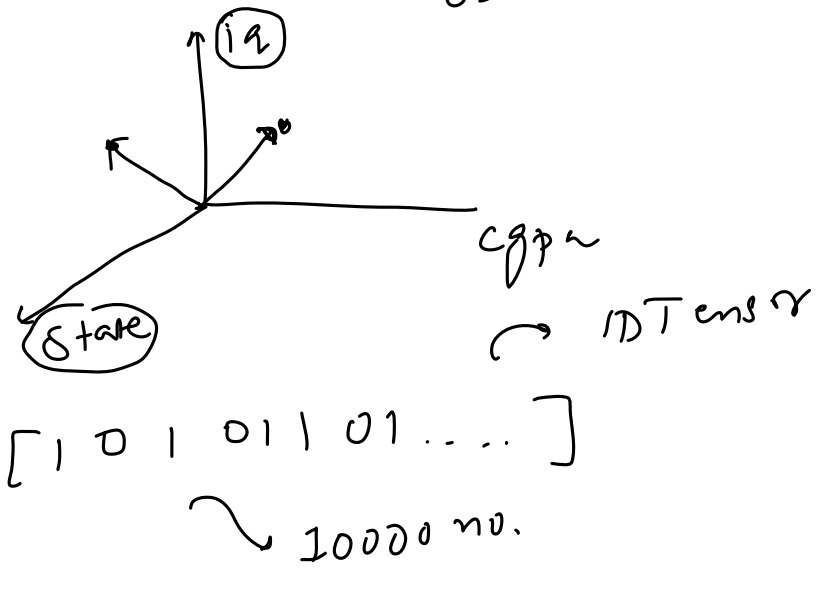

একটা student এর information কে vector. এই student এর info কে 1D tensor. One dimension tensor কে vector বলে multi dimensional vector. vector এর Dimension 100 কেন vector 1 D tensor.

Example of 2D Tensors

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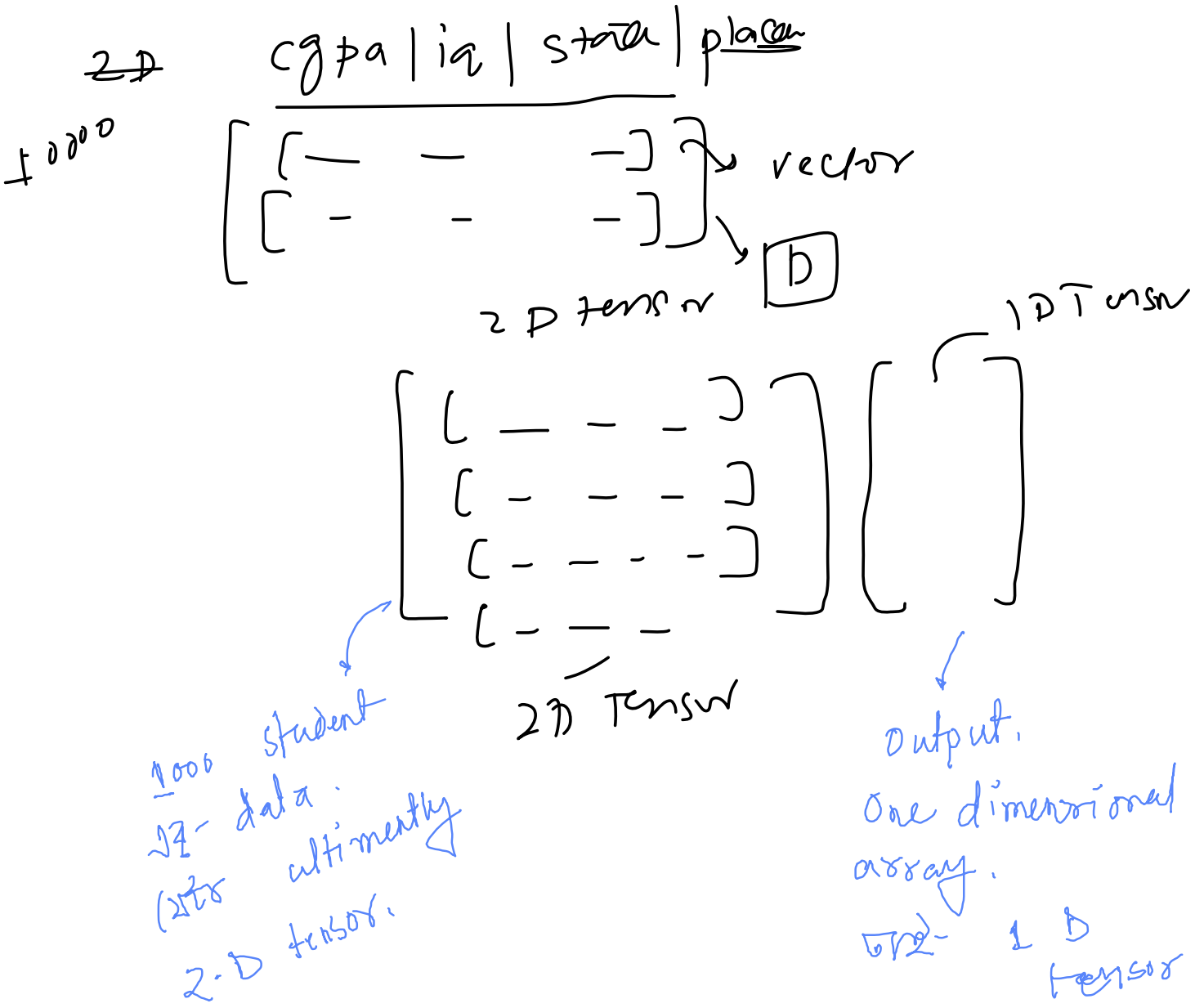

Example of 3D Tensors

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NLP

Hi Nitish
Hi Rahul
Hi Ankit

Hi	Nitish	Rahul	Ankit
1	0	0	0
0	1	0	0
0	0	1	0
0	0	0	1

[[[1,0,0,0],[0,1,0,0]]

(3,2,4)

[[1,0,0,0],[0,0,1,0]] → 3D Tensor

[[1,0,0,0],[0,0,0,1]]]

Timeseries Data (2)

Highest | Lowest

10 years

(365,2)

Day 1 — —

Day 2 — — → 2D → 10 →

Day 365 — —

365

(10, 365, 2)

time axis

→ 3D Tensor

Example of 4D Tensors

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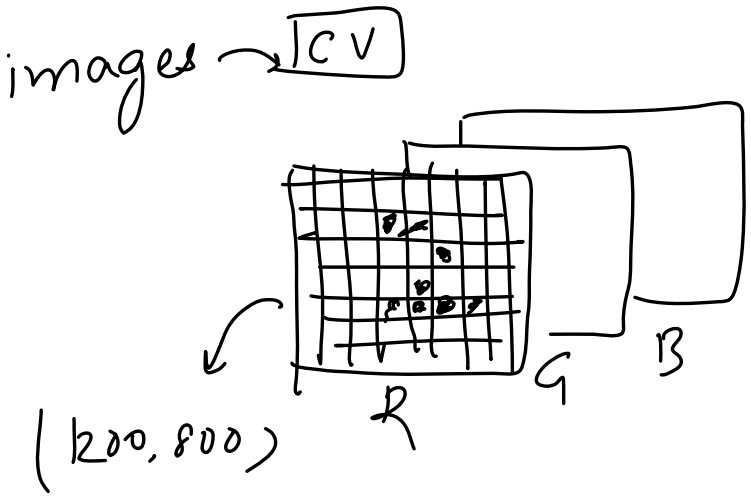

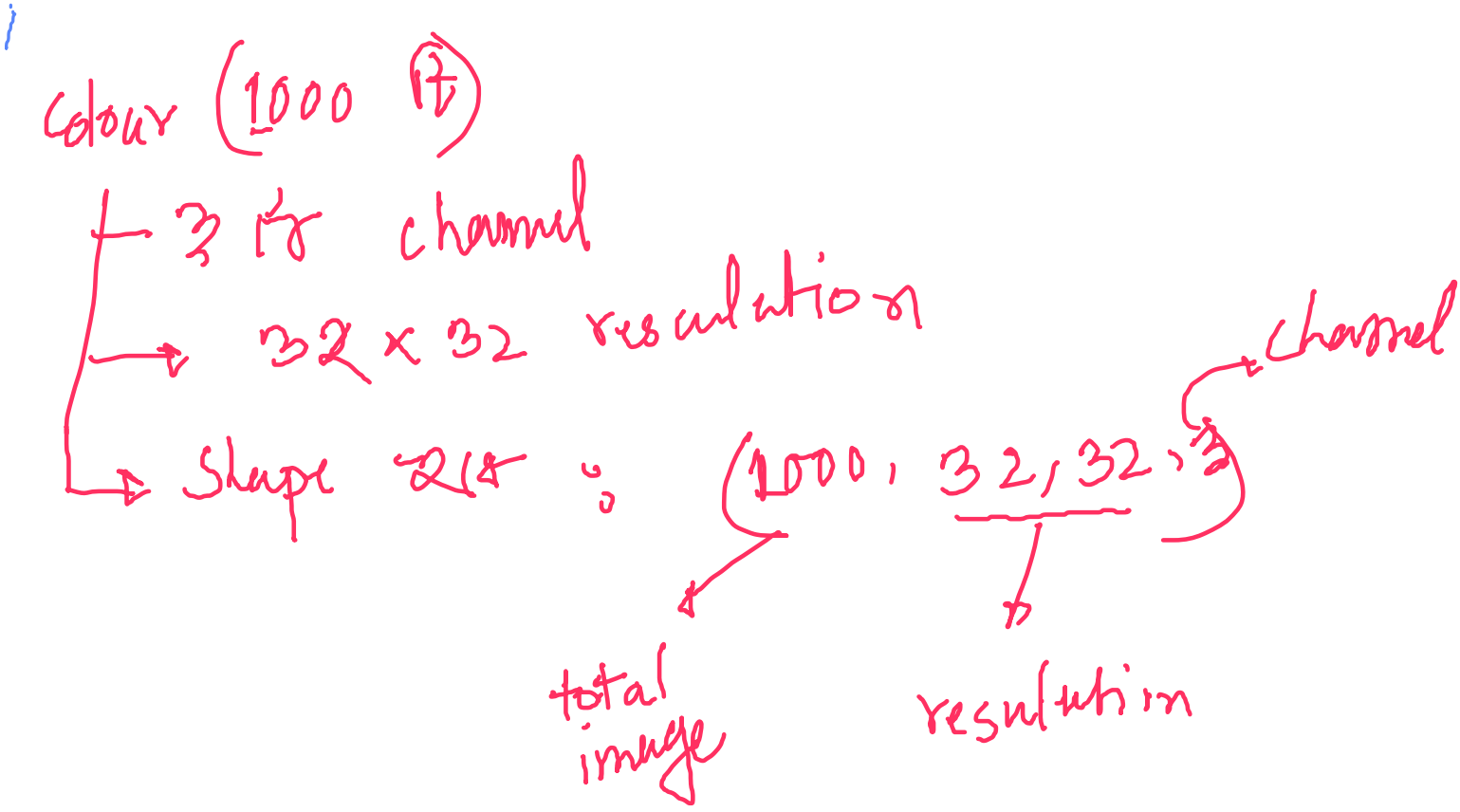

Example of 5D Tensors

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