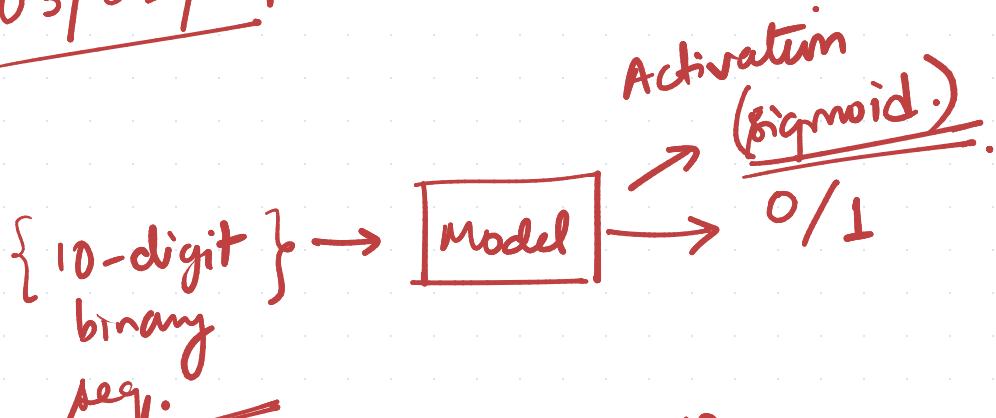


03/02/24



2-digit

$$\begin{array}{|c|c|} \hline x_2 & x_1 \\ \hline \end{array}$$
$$\begin{array}{|c|c|} \hline \#1 & \#0 \\ \hline \end{array}$$

$$2^{10} = 1024 \text{ input-o/p pairs.}$$

Training data = 1024

& DataGenerator.

- Data loader
- Training pipeline
- Validation pipeline

Pytorch → (rigid).
lightning ↓
rapid prototyping
(lr-search) ↓
optimal.

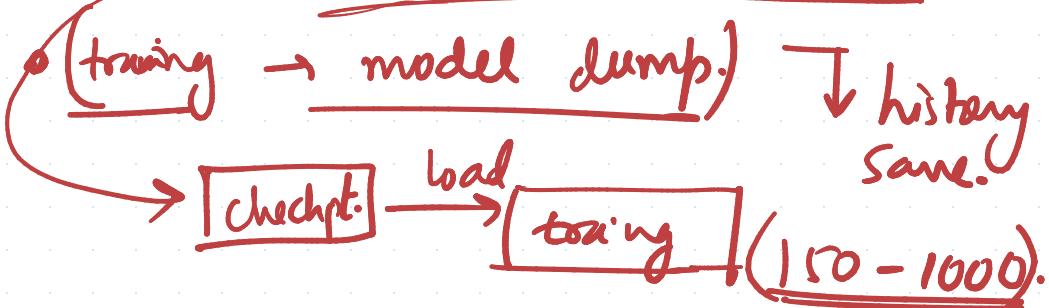
• Testing pipeline.

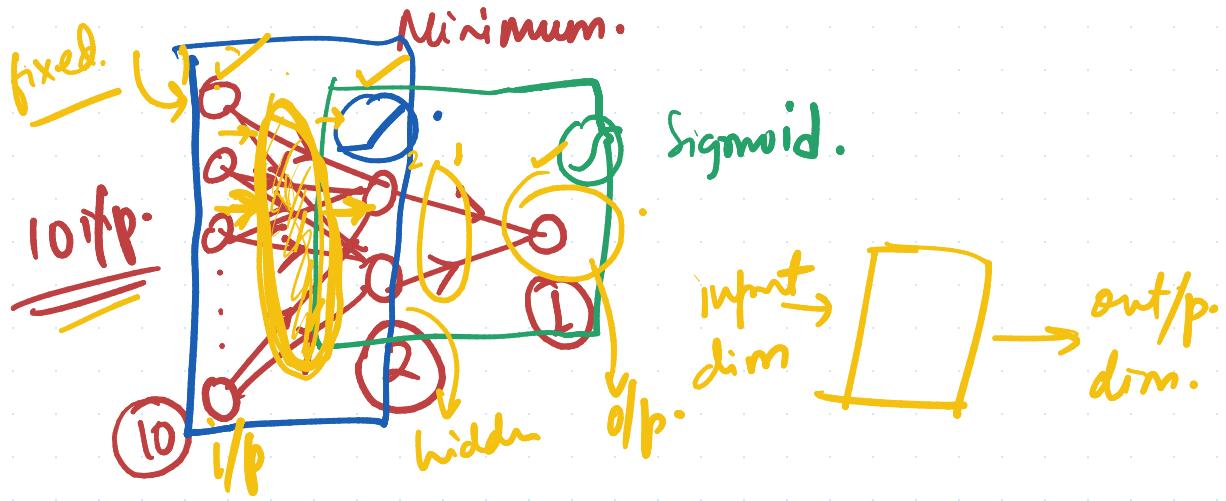
• Model.

• Resume.

1000 epochs.

→ 150 → power shutdown.





Model Defn: Class Based.

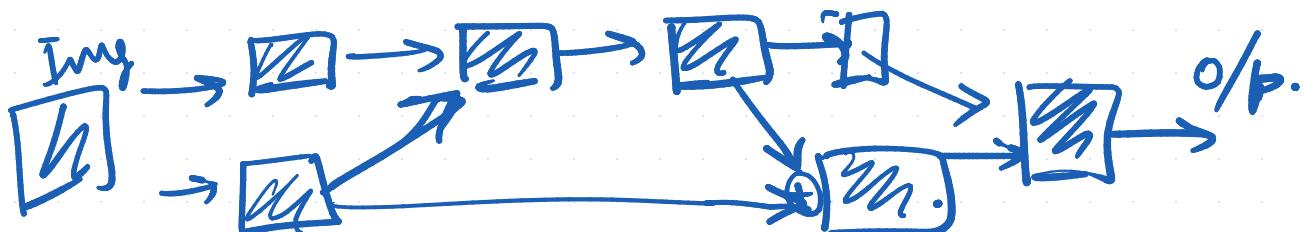
soul → init → op size, Actch., inpsize - } defined.

body → forward → Use defn. to construct model.

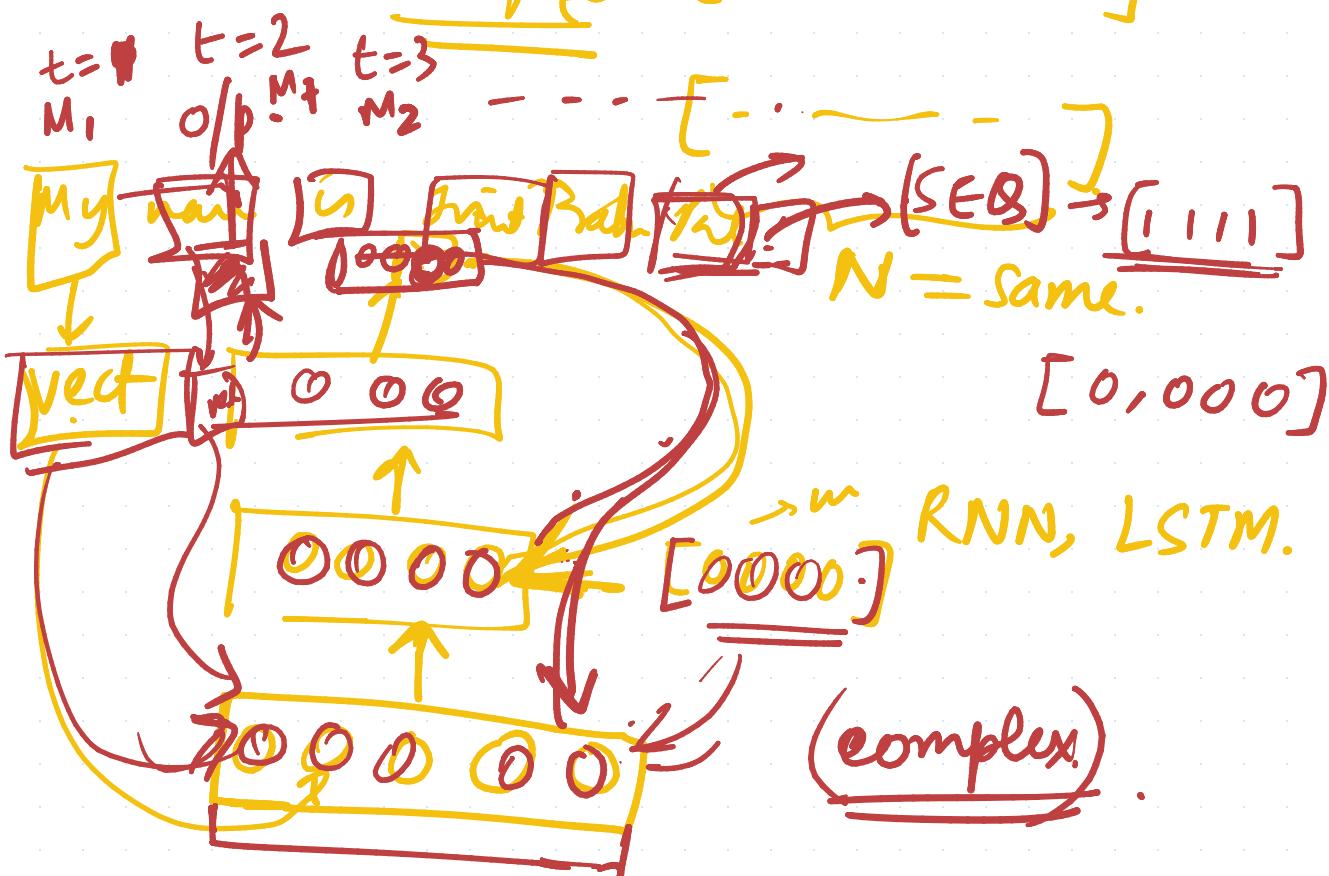
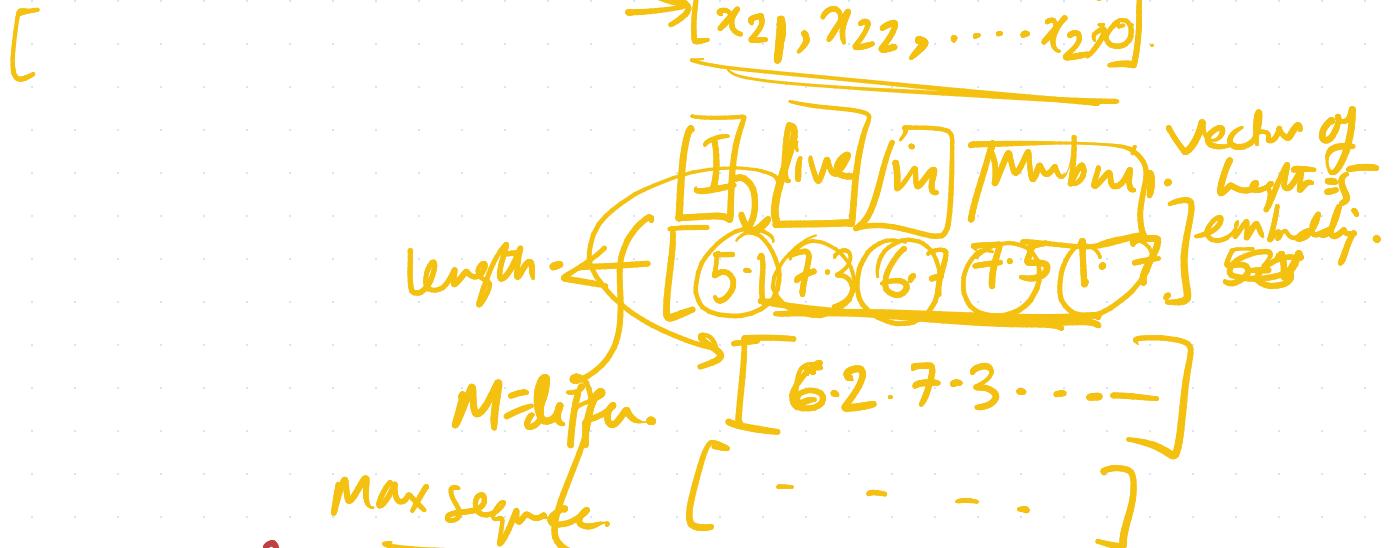
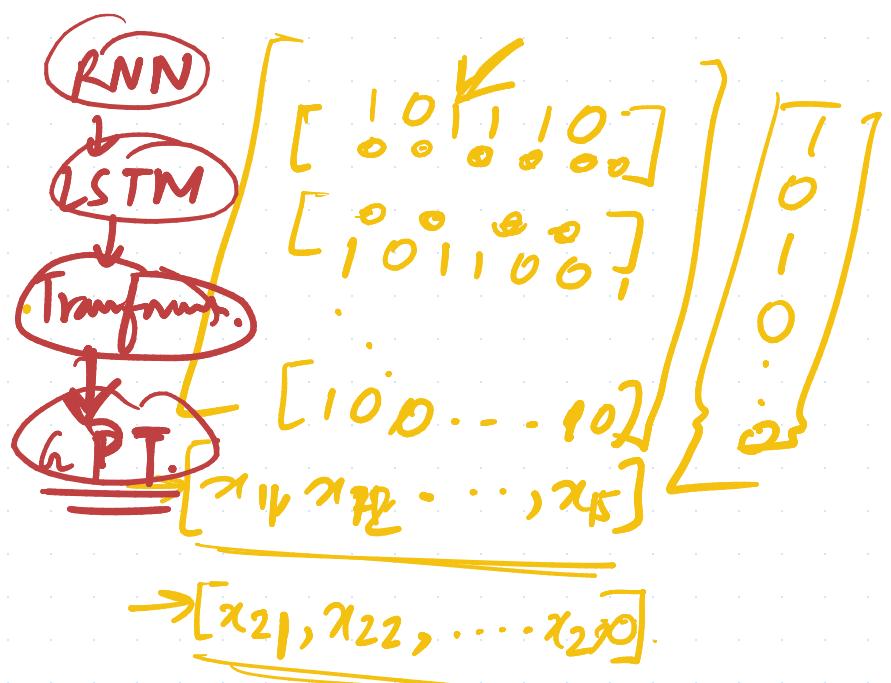
• conv2d = nn.Conv2d(inp, out, kernel size, padding, stride)

$x \rightarrow x_1 \rightarrow x_2 = \text{conv2d}(x)$

$x_1 \rightarrow x_2 = \text{conv2d}(x_1)$



Datagenerator
 → init
 → -- get_item()



1000 length \rightarrow LSTM.

[Ram is a good teacher]
[Somish - Shayna]

Somish - Shayna - LSTM.

Train. (APT \rightarrow 4000 words)

2 page

Pytorch Model load:

LSTM.

100.

Defn. of model required:

(Class Model())

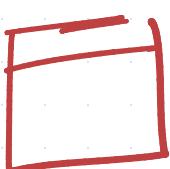


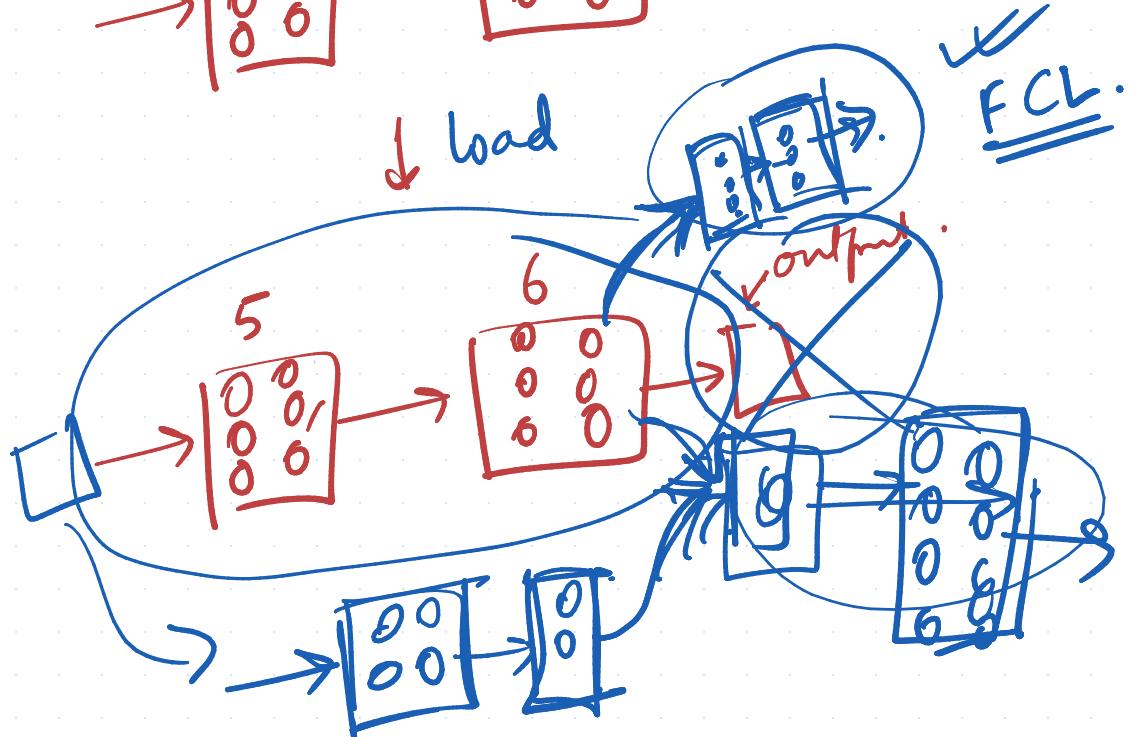
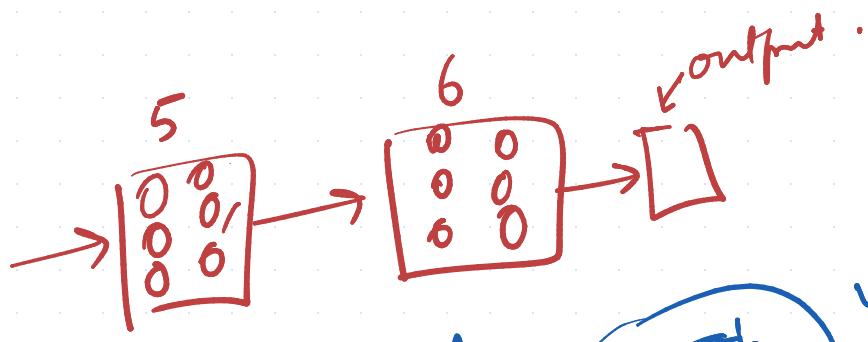
Keras

model.load(...)

Dump Keras: \rightarrow Dump defn. as binary.

(keras.h5)

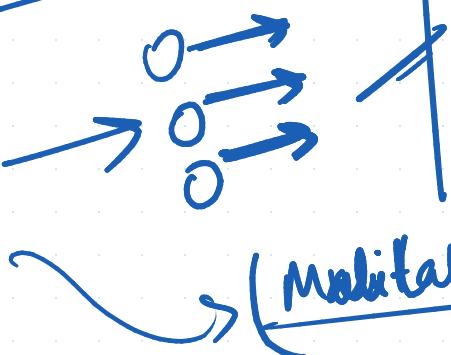
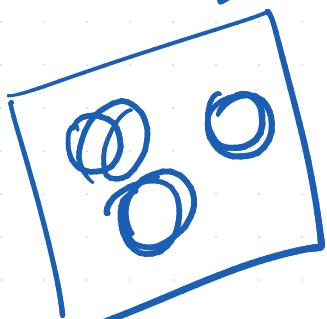




$\#1's > \#0's$

0101 ... 01.

10 → 2 → 1.

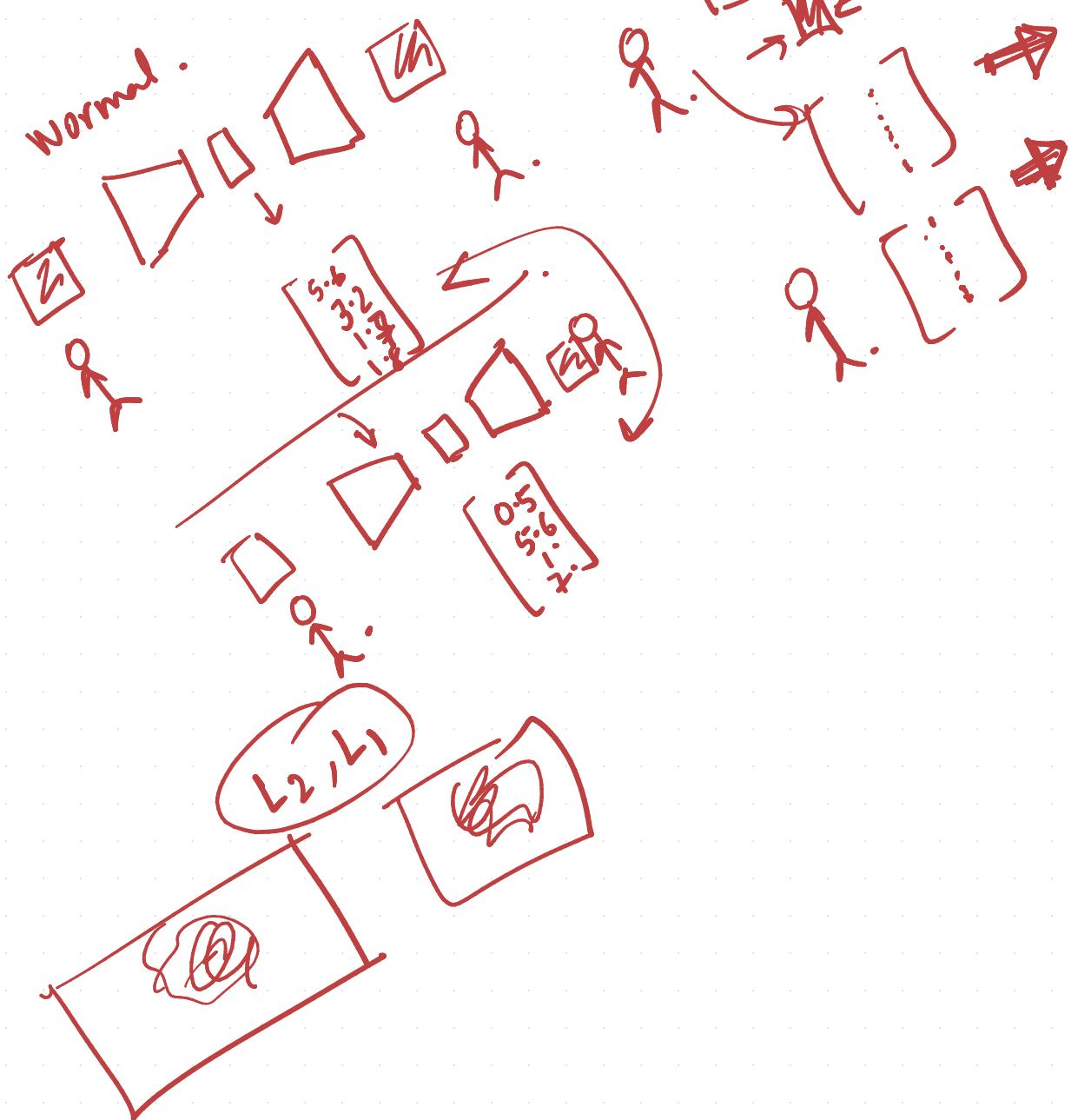


Dataloader
(softmax)

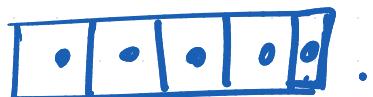
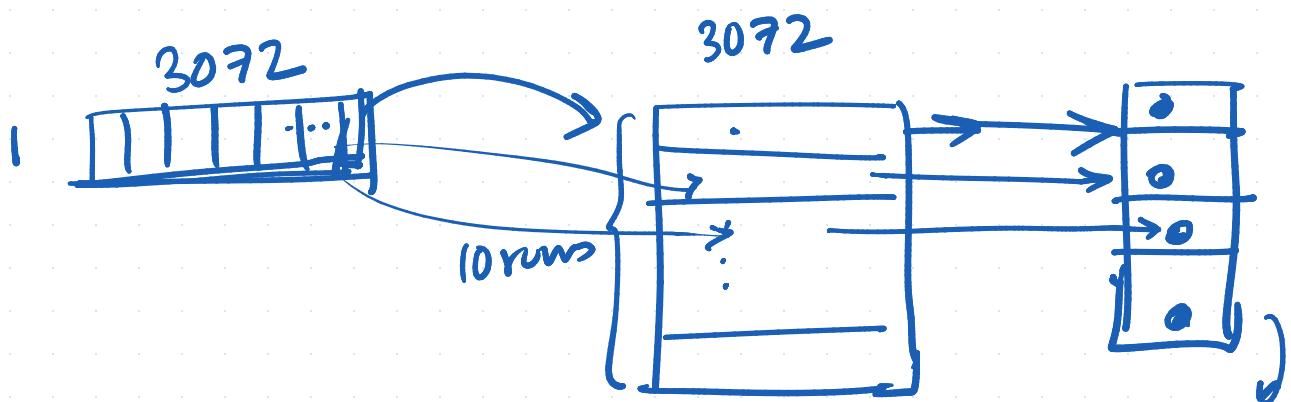
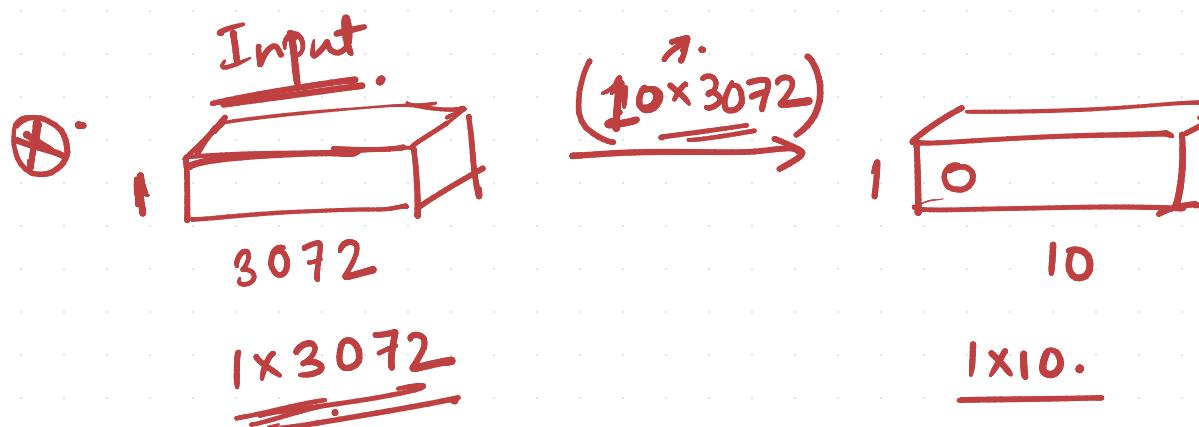
cat/dog/other
cls.

X.

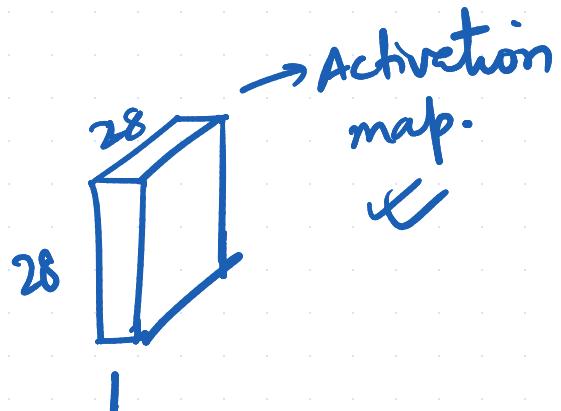
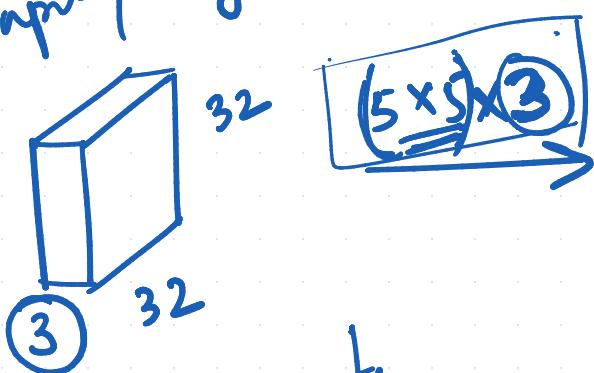
- (skip line) \rightarrow =
 (convolution / parameters) \rightarrow = (code / theory)
 Theory completion \rightarrow = 93
 Project / Recitation:
 Assignment discussion:



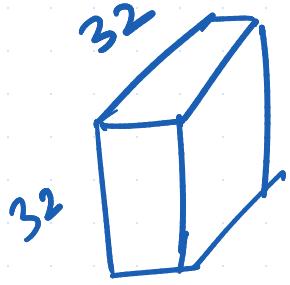
Convolution & Parameter Calculation



Input / Img



$$\begin{aligned} \# \text{parameters} &\Rightarrow 5 \times 5 \times 3 + 1 \\ \#(\text{weights} + \text{biases}) &\Rightarrow 75 + 1 = 76. \end{aligned}$$



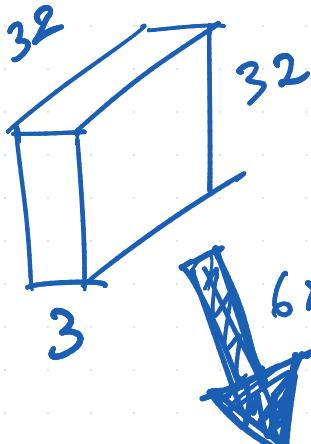
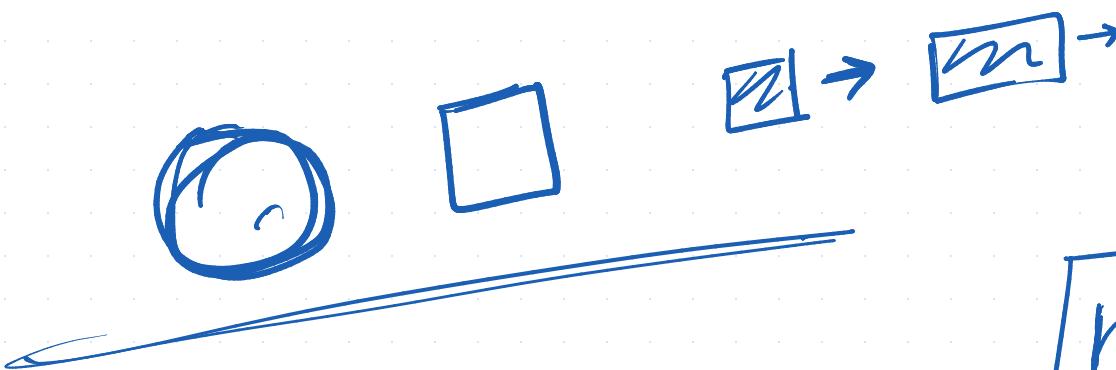
$$3 \times (5 \times 5) \cdot$$

Try to reduce
the no. of
parameters.

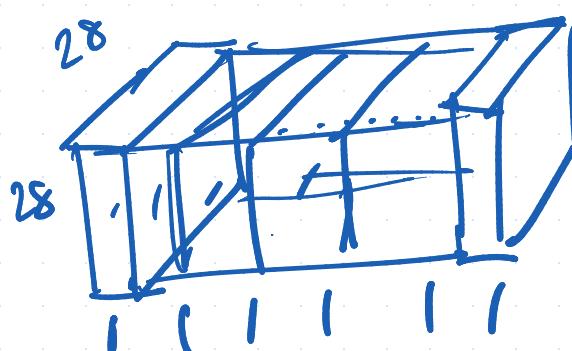
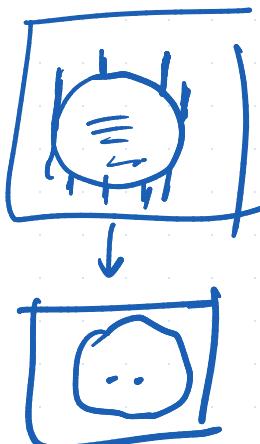
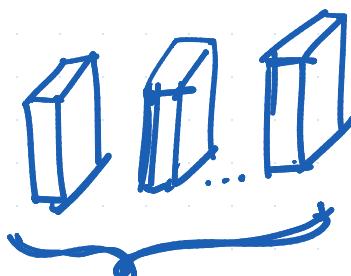
$$\begin{aligned} & (1 \times 5 \times 5) \times 3 + 3 \\ \Rightarrow & 75 + 3 = 78 \end{aligned}$$

76

L#7

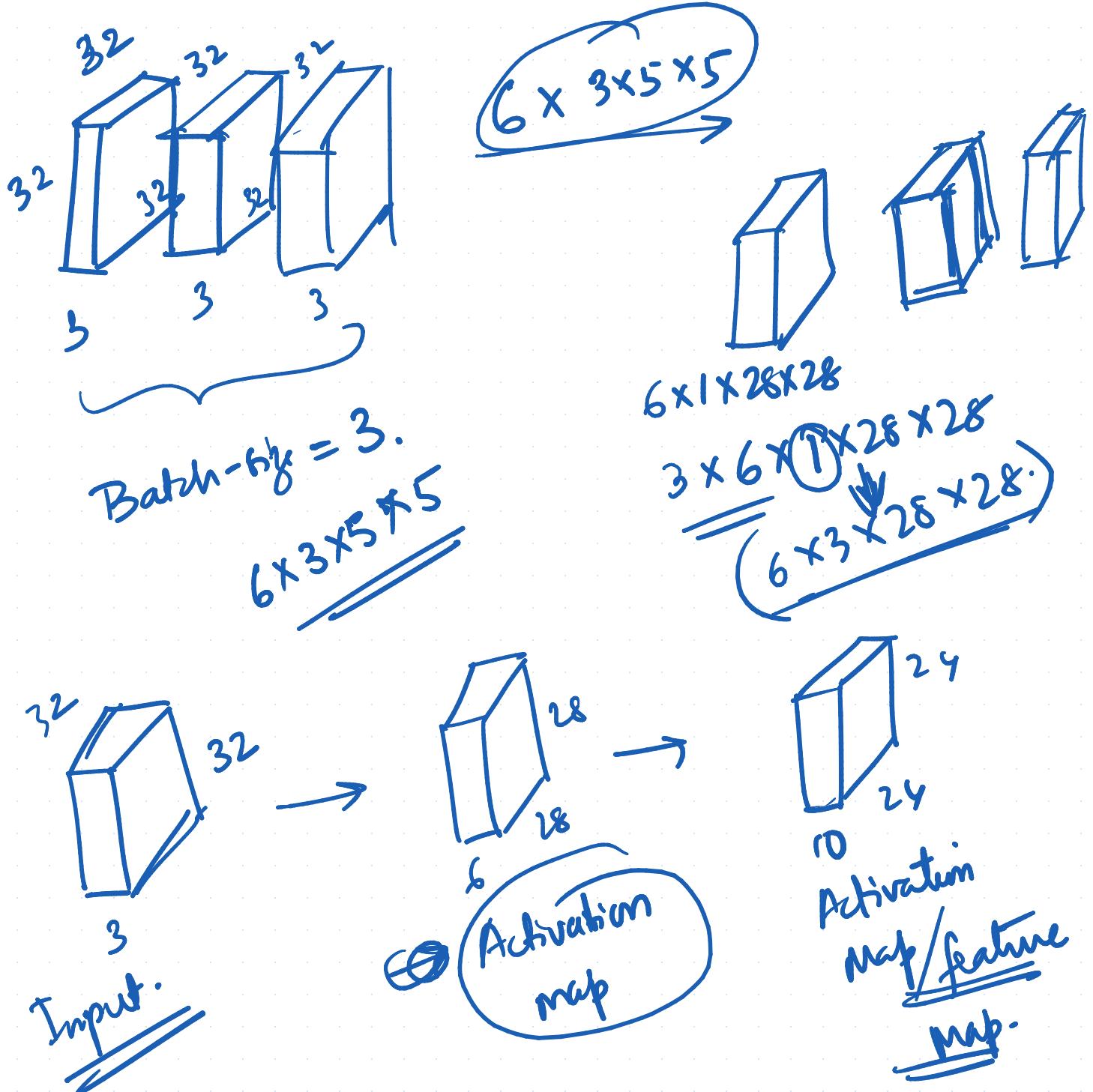


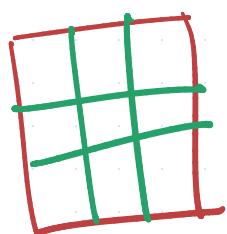
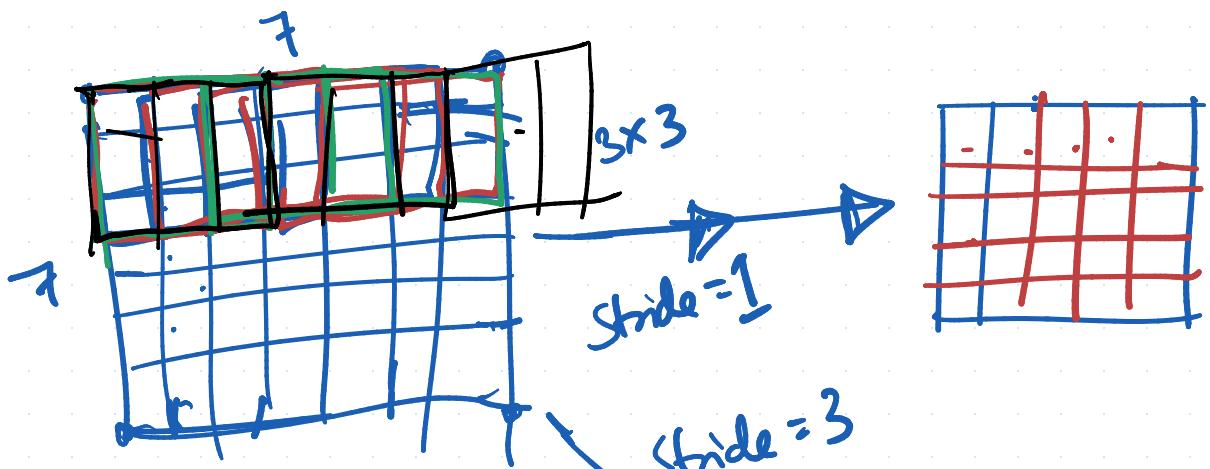
$$6 \times (3 \times 5 \times 5)$$



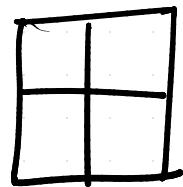
$$\begin{aligned} & 6 \times 1 \times 28 \times 28 \\ \downarrow & \\ & (6 \times 28 \times 28) \end{aligned}$$

parameters \Rightarrow $(6 \times 3 \times 5 \times 5 + 6)$ \Rightarrow .





C++



2x2

fast,

Python 3 - Competitive Programming

testcode

3



4 hrs →

ICPC

Wooft Code Jam 2

5

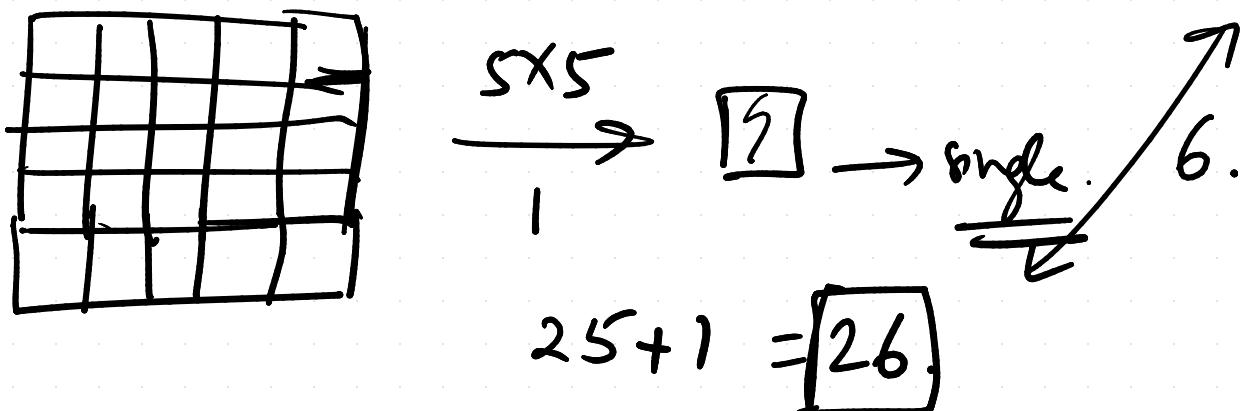
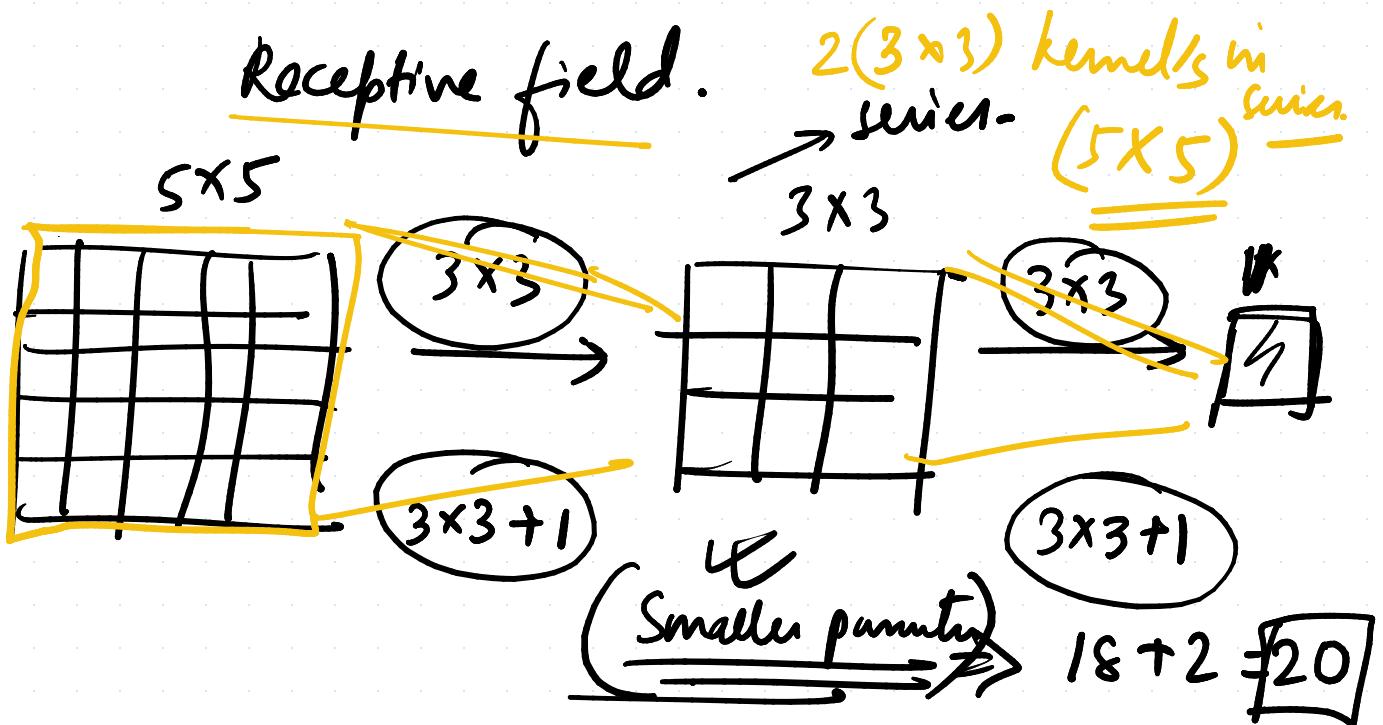
hard → problem.

$12 \times 4 \Rightarrow$

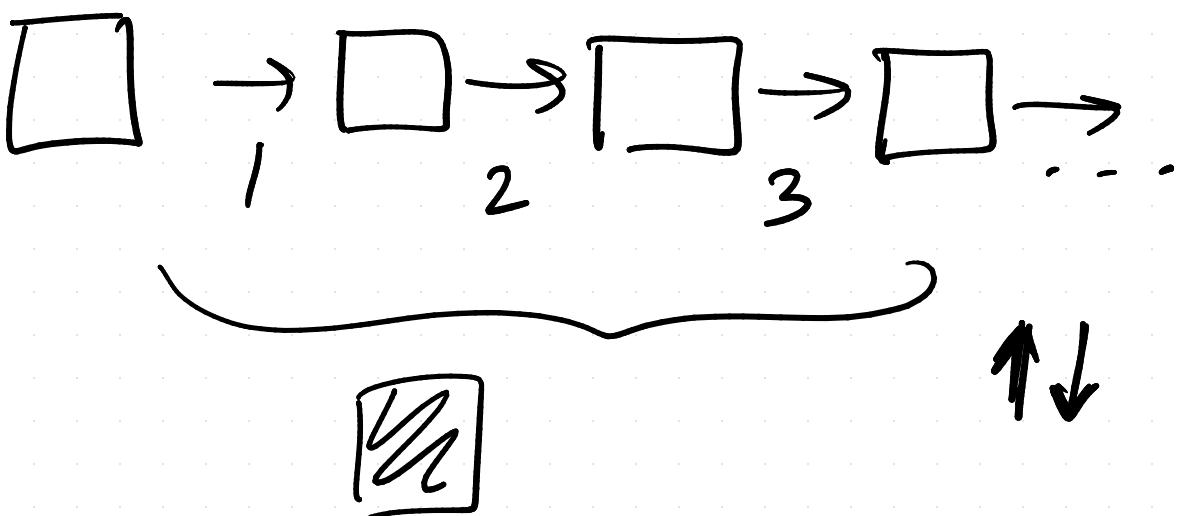
48

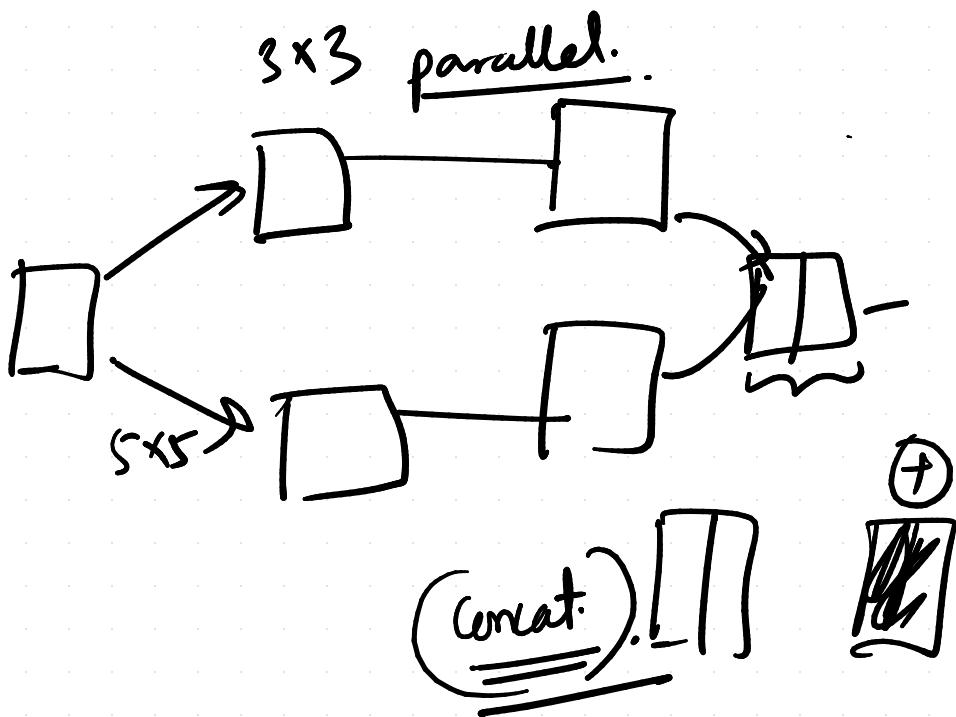
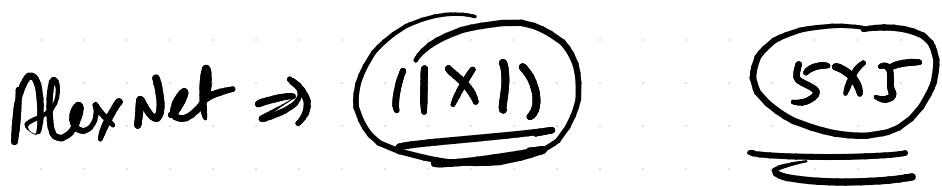
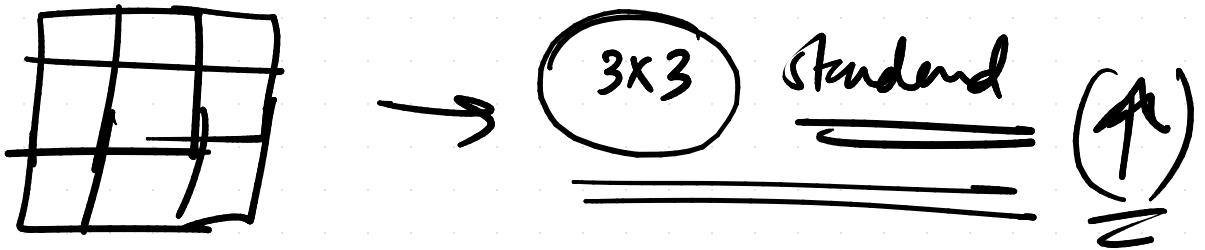
$\frac{25}{2} = 12$
DSA

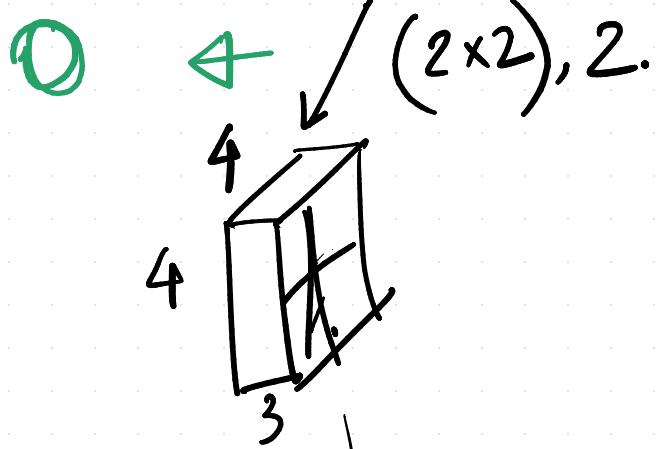
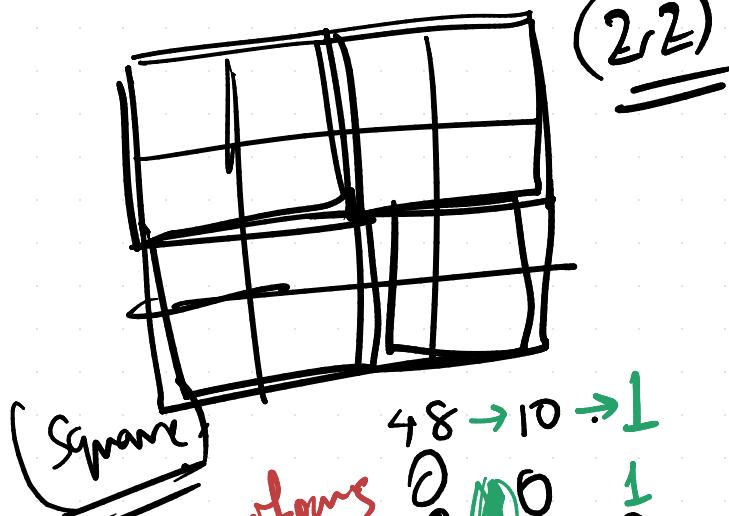
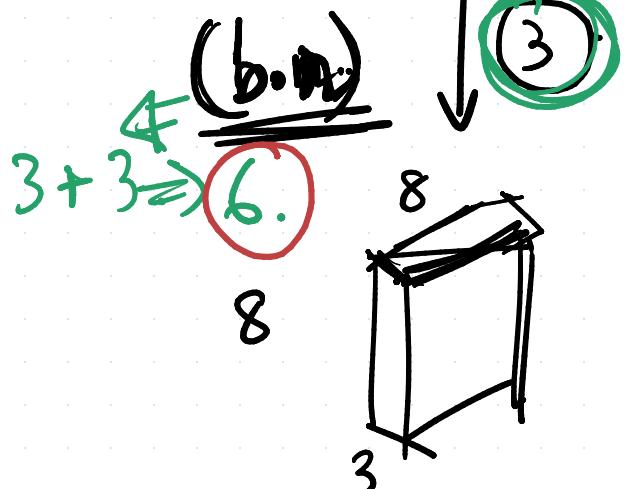
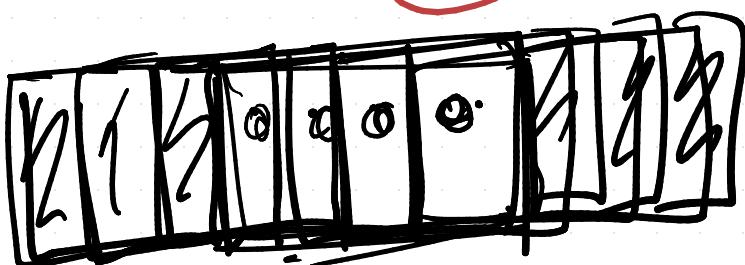
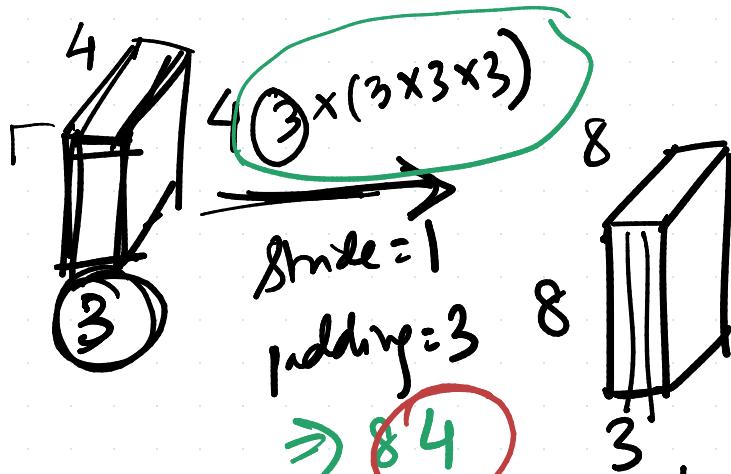
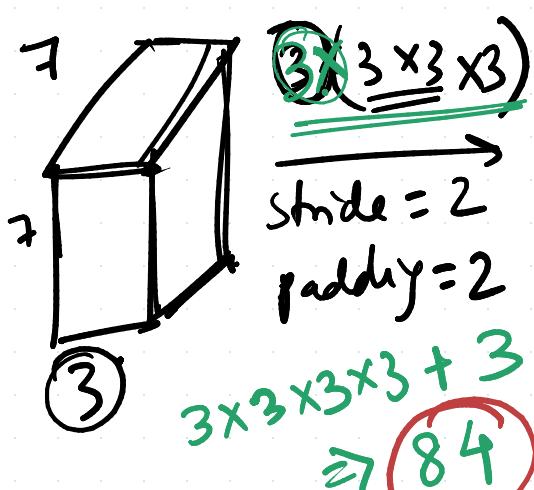
Google / Microsoft.



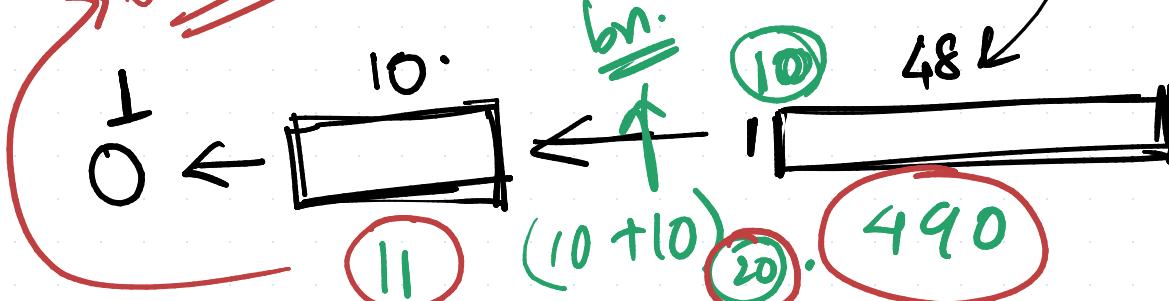
computation ↓ memory/storage ↓ overhead ↑







Total no. of params
 $695 \rightarrow 10 \rightarrow 1$
 695 param



$0 \leftarrow$
 flatten