# Calculation Speed Test with CPU and GPU

s1290224
Yuga Hanyu

・Source code used to measure the calculation speed:

```python
import torch
import time

# creating a random tensor of size (5000, 5000)
tensor_A = torch.rand( size = (5000, 5000) )

# check the current device
device = "cuda" if torch.cuda.is_available() else "cpu"

# put the tensor to the available device
tensor_on_device = tensor_A.to(device)

# start measuring the execution time
print("Starting matrix multiplication")
start = time.time()

# perform matrix multiplication
tensor_B = torch.matmul(tensor_on_device, tensor_on_device)

# stop measuring the execution time
end = time.time()

print(f'Execution time using {device}: {end - start} seconds.')
```

What this code does:

1. Create a random tensor of size (5000, 5000)
2. Put the created tensor on GPU, if available.
3. Perform matrix multiplication on the tensors (They are the same ones as created earlier).
4. Measure how much time it took to finish the multiplication.
5. Print the time.

・Result with the CPU on Google Colab

```
# stop measuring the execution time
end = time.time()

print(f'Execution time using {device}: {end - start} seconds.')
```

```
Starting matrix multiplication
Execution time using cpu: 5.844624280929565 seconds.
```

・Result with the GPU on the ML server

```
(base) yuga@spiketrain:~/work$ ls -l
total 8
-rw-rw-r-- 1 yuga yuga  22 Oct 24 02:19 hello.py
-rw-rw-r-- 1 yuga yuga 618 Oct 24 02:54 torch_speed_test.py
(base) yuga@spiketrain:~/work$ python3 torch_speed_test.py
Starting matrix multiplication
Execution time using cuda: 0.615025520324707 seconds.
(base) yuga@spiketrain:~/work$
```