



SITCON '21

LOCAL REGISTER

• 同個clock共用相同 registers 區塊 (4 Bytes)

• Block size = 1024 (threads) \rightarrow 每個 thread 有 $\frac{65536}{1024} = 64$ 個 registers

- registers不支援連續區塊劃分，無法宣告陣列
 - 若仍宣告陣列，會被分配到global memory位置
 - Performance issue!

Total number of registers available per block: 65536

LOCAL REGISTERS

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SHARED MEMORY

```
Total amount of shared memory per block:    49152 bytes
Total shared memory per multiprocessor:    102400 bytes
```

- 相同 block 下的 threads 可以存取到同樣區塊的shared memory
- 速度約等於registers，例外：**Bank conflict**
- **資料共享**
- Ex: **Matrix multiplication**

$$\begin{bmatrix} a_{11} & a_{12} & a_{13} & \cdots & a_{1n} \\ a_{21} & a_{22} & a_{23} & \cdots & a_{2n} \\ a_{31} & a_{32} & a_{33} & \cdots & a_{3n} \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ a_{m1} & a_{m2} & a_{m3} & \cdots & a_{mn} \end{bmatrix}_{m \times n}$$