{Loop Blocking} Analyzer Report

Introduction :

This report generated by CNN-EIA. The goal of this report is analysing the loop blocking of the given Machine Learning Model. The analysis was done on these inputs :

Memory Architecture :

```
{
mem_levels :            3
capacity :              [256.0, 65536.0, 536870912.0]
access_cost :           [0.96, 20, 200]
static_cost :           [0, 0, 0]
parallel_count :        [256, 1, 1]
mac_capacity :          0
parallel_mode :         [1, 0, 0]
parallel_cost :         [0.035]
precision :             16
array_dim :             None
utilization_threshold : 0.0
replication :           True
invalid_underutilized : True
memory_partitions :     [[0, 0, 0], [0, 0, 0], [0, 0, 0], [None, None, None]]
 }
```

Layer Architecture :

```
{
fmap_width :            28
fmap_height :           28
input_fmap_channel :    48
output_fmap_channel :   256
window_width :          5
window_height :         5
batch_size :            16
stride_width :          1
stride_height :         1
layer_info :            [28, 28, 48, 256, 5, 5, 16, 1, 1]
layer_name :            alex_conv2_batch16
 }
```

Schedule Architecture :

```
{
schedule_hint :                 {0: [[0, 5, 1], None, None], 1: [[2, 1, 5], None, None],
```

3: [[3, 1, 28], None, None]}
partition_loops :   None
}

Glossary :

- Cache Levels : (L0, L1, L2)
  The smallest index the nearest to CPU.

- Loop Names : (MEM, FX, FY, OX, OY, OC, IC, ON)

Analysis Output :

Map Configuration

Loop Blocking (factors):

MEM	L0	L1	L2
FX	5	1	1.0
FY	1	1	1.0
OX	14	2.0	1.0
OY	1	1	1.0
OC	8	1	32.0
IC	1	48.0	1.0
ON	1	1	16.0

The factors of each loop for each cache.

Loop Partitioning (units):

MEM	L0	L1	L2
FX	1	1	1
FY	5	1	1
OX	1	1	1
OY	28	1	1
OC	1	1	1
IC	1	1	1
ON	1	1	1

Take the processing elements from parallel memories.

Loop Ordering :

MEM	L0	L1	L2
FX	0	6	6
FY	1	6	6
OX	2	1	6
OY	3	6	6
OC	4	6	0
IC	6	0	6
ON	6	6	1

The order on each cache.

Schedule

The Best format for schedule found is :

MEM - L0:
```
    for ( OC, 8b, 1p )
      for ( OY, 1b, 28p )
         for ( OX, 14b, 1p )
             for ( FY, 1b, 5p )
                for ( FX, 5b, 1p )
      spatially unrolled loops: (FX)(FY)(OY)
```

MEM - L1:
```
    for ( OX, 2b, 1p )
      for ( IC, 48b, 1p )
```

MEM - L2:
```
    for ( ON, 16b, 1p )
      for ( OC, 32b, 1p )
```

Cost

MEM	ENERGY (PJ)
L0	15926883778.56
L0-PARA	15926883778.56
L1	14599782.399999976
L2	764149760.0
TOTAL	18488212520.96