# SDC Assignment Report

## Task 1

**Q1**. The obtained latency is always minimal since there are no resource constraints. The latency is determined solely by data dependencies. At any given moment all ready-operations are scheduled. The solution is unique.

**Q2**. The scheduling problem should be solved for each BB individually because the BBs are executed sequentially as stated in the task description. If we scheduled the CDFG as a whole, some BBs would have overlapping schedules, thus violating this requirement. By doing this the complexity of the problem is reduced significantly.

## Task 2

**Q1**. Since I used the tip from remark a) the ALAP latency is identical to the ASAP latency. Slack describes the mobility of an operation. It is defined as the difference of starting times between ASAP and ALAP. It can be used as a priority measure for resource constrained scheduling.

**Q2**. It depends on the kernel. For BB0 in kernel\_1 ASAP has concurrent 4 memory accesses in cycle 0. Thus, ALAP would be favorable since it requires less area for the same performance. For kernel\_2, ALAP is favorable for the same reason as kernel\_1.

## Task 3

**Q1**. Assuming sequential execution of each BB:

|  |  |
| --- | --- |
| Area (mul, add, zext) | Latency Kernel 1 |
| 3 (1,1,1) | 25 |
| 6 (2,2,2) | 25 |
| 9 (3,3,3) | 25 |
| 4 (2,1,1) | 25 |
| 4 (1,2,1) | 28 |
| 4 (1,1,2) | 28 |

|  |  |
| --- | --- |
| Area (mul, add, zext) | Latency Kernel 2 |
| 3 (1,1,1) | 26 |
| \* | 26 |

|  |  |
| --- | --- |
| Area (mul, add, zext) | Latency Kernel 3 (one iter.) |
| 3 (1,1,1) | 18 |
| 6 (2,2,2) | 15 |
| 9 (3,3,3) | 14 |
| 4 (2,1,1) | 18 |
| 4 (1,2,1) | 17 |
| 4 (1,1,2) | 16 |
| 5 (1,1,3) | 16 |
| 5 (1,2,2) | 15 |
| 6 (1,3,2) | 14 |
| 6 (1,2,3) | 15 |

|  |  |
| --- | --- |
|  | = pareto-optimal configuration |

**Q2**. See pareto-optimal configurations in green; they provide the best latency considering the required area and you cannot achieve the respective latency with less area.

## Task 4

**Q1**. Ltot = Lentry + Lloop.body+II\*(N-1) + Lloop.end

**Q2**. Kernel\_3: II = 2, Kernel\_4: II = 19

## Task 5

**Q1**.

**Q2**.