Cameron Calv and Nicholas Sica
ECEC 621 High-Performance Computer Architecture
Project Five B –Memory Controller

First Come First Served (FCFS) Scheduling Evaluation

Below is a table showing how many memory conflicts are encountered using the first come first served scheduling technique. The execution time is also recorded in the table and is compared to the execution time of an out-of-order machine on the same workloads. Five workloads were picked to use and their names are listed in the table below.

Table 1: Number of memory conflicts encountered and the execution time for the whole trace for five AI workloads.

Workload	Memory Conflicts	Execution Time
507 CactusBSSN	21302958364	217824869
520 Omnetpp	629245264	7054792
523 Xalancbmk	649128164	6954365
554 Roms	406588868364	4183375182
MP10	83122048864	854642453

Compare FCFS and Out-of-Order (OoO) Memory Controller

Next, we compare how the execution time of the workloads may improve if we were to implement an out-of-order memory controller for use with scheduling.

Table 2: Comparison of the execution time of the AI traces using the FCFS technique and an OoO memory controller. The values highlighted in green represent the minimum of the two execution times.

Workload	FCFS Execution Time	OoO Execution Time
507 CactusBSSN	217824869	70818560
520 Omnetpp	7054792	5077278
523 Xalancbmk	6954365	3120592
554 Roms	4183375182	892399211
MP10	854642453	174946914

It seems that in all cases the out-of-order memory controller outperforms the FCFS scheduling technique sometimes increasing the performance by an entire order of magnitude.