Visualization of Data Movements and Accesses

Til Mohr





Listing 1: Matrix Summation

```
1 let matrix = Matrix::random(2, 2);
2 let mut sum = 0;
3 for column in 0..2 {
4   for row in 0..2 {
5     sum += matrix.get(row, column);
6   }
7 }
8 sum
```

Matrix:



Listing 2: Matrix Summation

```
1 let matrix = Matrix::random(2, 2);
2 let mut sum = 0;
3 for column in 0..2 {
4   for row in 0..2 {
5     sum += matrix.get(row, column);
6   }
7 }
8 sum
```

Matrix:

Matrix in Memory:

1 2 3 4



Listing 3: Matrix Summation

```
1 let matrix = Matrix::random(2, 2);
2 let mut sum = 0;
3 for column in 0..2 {
4   for row in 0..2 {
5     sum += matrix.get(row, column);
6   }
7 }
8 sum
```

Matrix: Matrix in Memory: 0 1

Current Item: Cache:

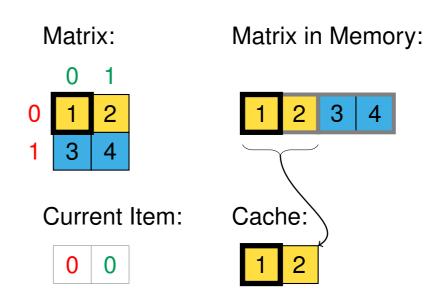
0 0





Listing 4: Matrix Summation

```
1 let matrix = Matrix::random(2, 2);
2 let mut sum = 0;
3 for column in 0..2 {
4   for row in 0..2 {
5     sum += matrix.get(row, column);
6   }
7 }
8 sum
```







Listing 5: Matrix Summation

```
1 let matrix = Matrix::random(2, 2);
2 let mut sum = 0;
3 for column in 0..2 {
4   for row in 0..2 {
5     sum += matrix.get(row, column);
6   }
7 }
8 sum
```

Matrix: Matrix in Memory: 0 1 1 2 1 2 3 4

Current Item: Cache:

1 0

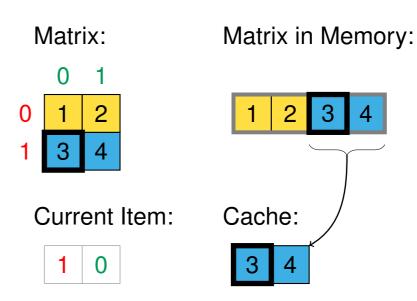
1 2





Listing 6: Matrix Summation

```
1 let matrix = Matrix::random(2, 2);
2 let mut sum = 0;
3 for column in 0..2 {
4   for row in 0..2 {
5     sum += matrix.get(row, column);
6   }
7 }
8 sum
```



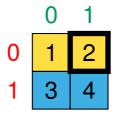




Listing 7: Matrix Summation

```
1 let matrix = Matrix::random(2, 2);
2 let mut sum = 0;
3 for column in 0..2 {
4   for row in 0..2 {
5     sum += matrix.get(row, column);
6   }
7 }
8 sum
```

Matrix: Matrix in Memory:





Current Item: Cache:

0 1

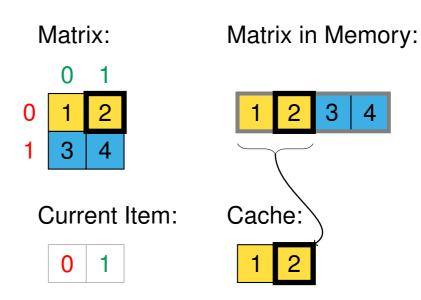
3 4





Listing 8: Matrix Summation

```
1 let matrix = Matrix::random(2, 2);
2 let mut sum = 0;
3 for column in 0..2 {
4   for row in 0..2 {
5     sum += matrix.get(row, column);
6   }
7 }
8 sum
```



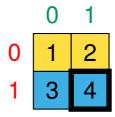




Listing 9: Matrix Summation

```
1 let matrix = Matrix::random(2, 2);
2 let mut sum = 0;
3 for column in 0..2 {
4   for row in 0..2 {
5     sum += matrix.get(row, column);
6   }
7 }
8 sum
```

Matrix: Matrix in Memory:





Current Item: Cache:

1 1

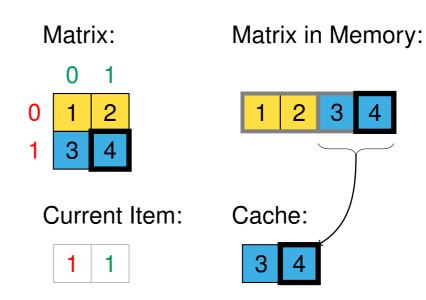
1 2





Listing 10: Matrix Summation

```
1 let matrix = Matrix::random(2, 2);
2 let mut sum = 0;
3 for column in 0..2 {
4   for row in 0..2 {
5     sum += matrix.get(row, column);
6   }
7 }
8 sum
```

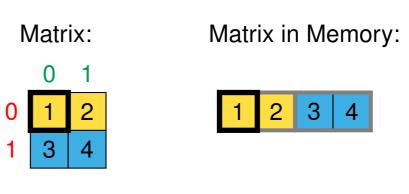






Listing 11: Matrix Summation

```
1 let matrix = Matrix::random(2, 2);
2 let mut sum = 0;
3 for row in 0..2 {
4   for column in 0..2 {
5     sum += matrix.get(row, column);
6   }
7 }
8 sum
```



Current Item: Cache:

0 0

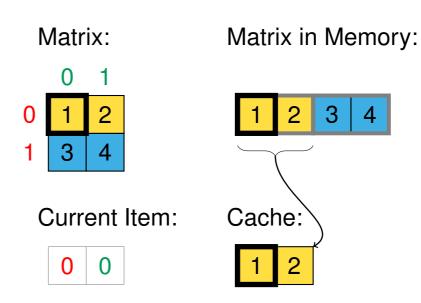






Listing 12: Matrix Summation

```
1 let matrix = Matrix::random(2, 2);
2 let mut sum = 0;
3 for row in 0..2 {
4   for column in 0..2 {
5     sum += matrix.get(row, column);
6   }
7 }
8 sum
```

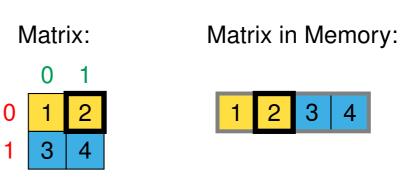






Listing 13: Matrix Summation

```
1 let matrix = Matrix::random(2, 2);
2 let mut sum = 0;
3 for row in 0..2 {
4   for column in 0..2 {
5     sum += matrix.get(row, column);
6   }
7 }
8 sum
```



Current Item: Cache:

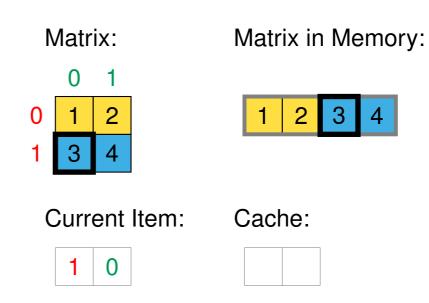
0 1 2





Listing 14: Matrix Summation

```
1 let matrix = Matrix::random(2, 2);
2 let mut sum = 0;
3 for row in 0..2 {
4   for column in 0..2 {
5     sum += matrix.get(row, column);
6   }
7 }
8 sum
```

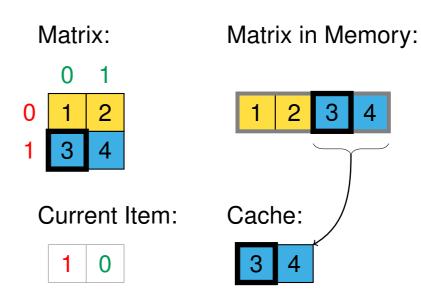






Listing 15: Matrix Summation

```
1 let matrix = Matrix::random(2, 2);
2 let mut sum = 0;
3 for row in 0..2 {
4   for column in 0..2 {
5     sum += matrix.get(row, column);
6   }
7 }
8 sum
```

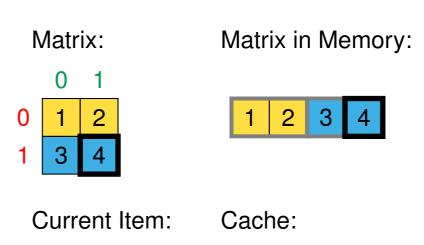






Listing 16: Matrix Summation

```
1 let matrix = Matrix::random(2, 2);
2 let mut sum = 0;
3 for row in 0..2 {
4   for column in 0..2 {
5     sum += matrix.get(row, column);
6   }
7 }
8 sum
```





Outline



