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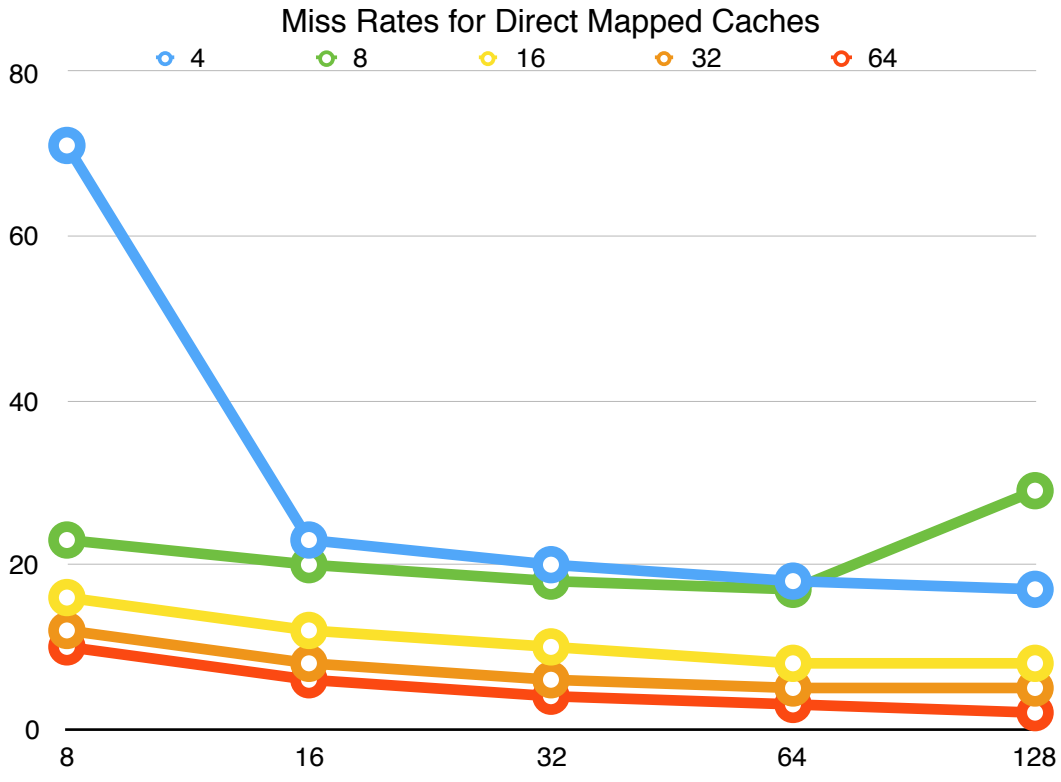
## DATA CACHE PARMETERS

### .data size = 100, buffer size = 20100

a) Direct Mapped

| CACHE vs BLOCK SIZE HIT RATE % | 4 | 8 | 16 | 32 | 64 |
|---|---|---|---|---|---|
| **8** | 29 | 77 | 84 | 88 | 90 |
| **16** | 77 | 80 | 88 | 92 | 94 |
| **32** | 80 | 82 | 90 | 94 | 96 |
| **64** | 82 | 83 | 92 | 95 | 97 |
| **128** | 83 | 71 | 92 | 95 | 98 |



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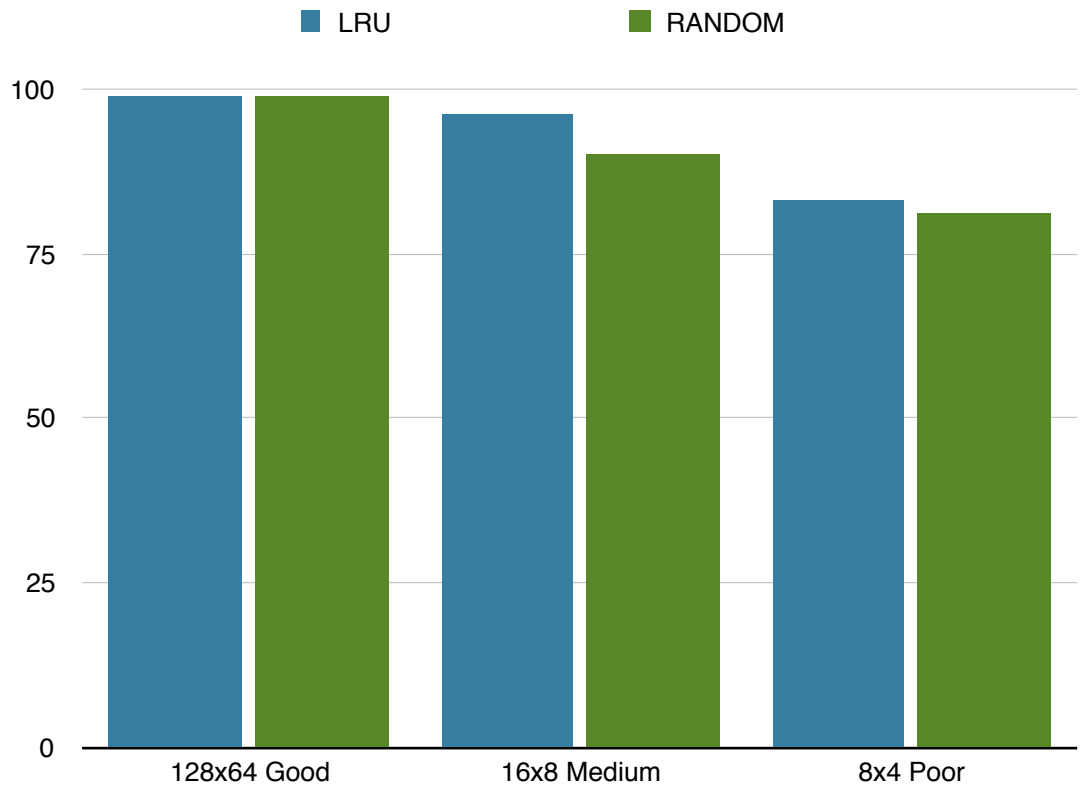
b) Fully Associative over Direct Mapped

| BLOCK SIZE x CACHE | Good (128x64) | Medium (8x16) | Poor (8x4) |
|---|---|---|---|
| Direct Mapped | 98 | 84 | 29 |
| Fully Associative | 99 | 96 | 83 |



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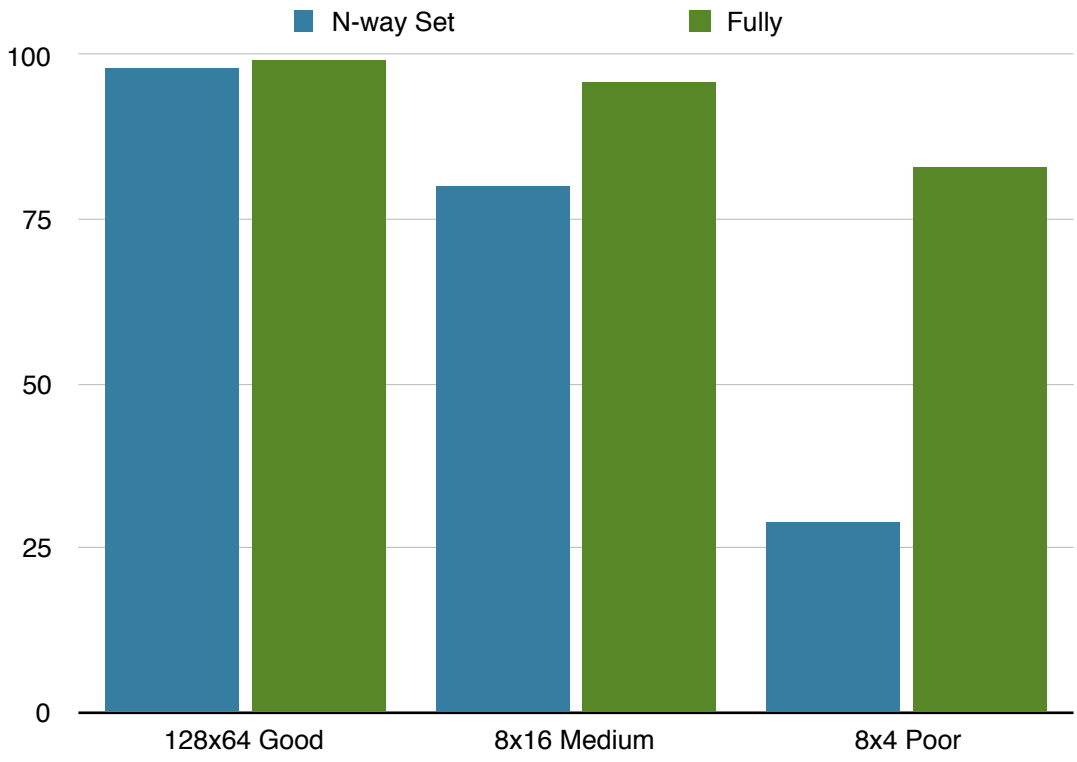
c) N-way set associative over Fully Associative

| BLOCK SIZE x CACHE | Good (128x64) | Medium (8x16) | Poor (8x4) |
|---|---|---|---|
| N-way Set Associative | 98 | 66 | 22 |
| Fully Associative | 99 | 96 | 83 |



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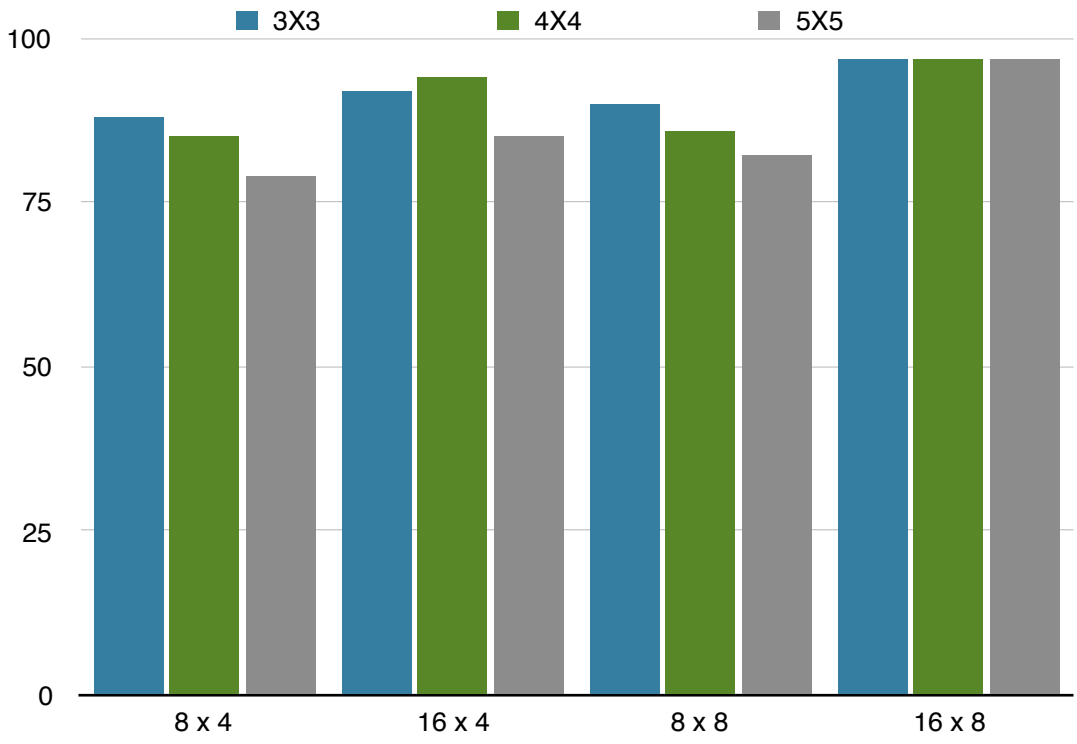
## PROGRAM FACTORS

| MATRIX SIZE / BLOCK X CACHE SIZE | 3x3 | 4x4 | 5x5 |
|---|---|---|---|
| 8 x 4 | 88 | 85 | 79 |
| 16 x 4 | 92 | 94 | 85 |
| 8 x 8 | 90 | 86 | 82 |
| 16 x 8 | 97 | 97 | 97 |



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A)

| n (=size) | Fill time (in seconds) | Sort time (in seconds) |
|---|---|---|
| 50 | 0.004 | 3.096 |
| 100 | 0.005 | 11.714 |
| 200 | 0.005 | 46.799 |

In the reversed version of the subtraction, because of the cache mismatch sorting is very slow when is compared with the normal one. When the datas are loaded into cache the neighbours of the addresses also loaded but in the reversed version, every load is mismatch.

D)

| n (=size) | Unrolled Sort | Normal Sort |
|---|---|---|
| 50 | 2.425 | 3.096 |
| 100 | 9.227 | 11.714 |
| 200 | 37.322 | 46.799 |