

p4B\_worksheet.pdf: For given cache config, determine hits (H) and misses (M) for each instruction in the trace. All addresses are in hexadecimal. All sizes are 1,2,4, or 8 bytes.

```
./csim [-hv] -s <s> -E <E> -b <b> -t <tracefile>
-h: Optional help flag that prints usage info
-v: Optional verbose flag that displays trace info
-s <s>: Number of s bits for set index
-E <E>: number of lines per set (associativity)
-b <b>: Number of b bits for block offsets
-t <tracefile>: Name of the valgrind trace to replay
```

```
./csim -s 4 -E 2 -b 4 -t traces/trace1
operation address, size
L 0,1
L 1,1
L 2,1
L 3,1
S 4,1
L 5,1
S 6,1
L 7,1
S 8,1
L 9,1
S a,1
L b,1
S c,1
L d,1
S e,1
M f,1
```

$A = 16$  sets  
 $2$  line/set  
 $2^4 = 16$  byte/block  
 B 1100

```
./csim -s 4 -E 1 -b 4 -t traces/trace2
L 10,1
M 20,1
L 22,1
S 18,1
L 110,1
L 210,1
M 12,1
```

$S = 2^4 = 16$  sets  
 $E = 1$  line/set  
 $B = 2^4 = 16$  byte/block

```
./csim -s 2 -E 3 -b 3 -t traces/trace3
L 10,4
S 18,4
L 20,4
S 28,4
S 50,4
```

```
./csim -s 3 -E 4 -b 5 -t traces/trace4 (this only partial list of trace4)
```

```
S 00600aa0,1
T 004005b6,5
S 7ff000398,8
T 0040051e,1
S 7ff000390,8
T 0040051f,3
T 00400522,4
S 7ff000378,8
T 0040052c,4
S 7ff000370,8
T 0040052a,7
S 7ff000384,1
T 00400531,2
T 00400581,4
L 7ff000384,4
```

$S = 8$  sets  
 $B = 32$  b  
 $E = 4$



Draw memory diagram (in whitespace above) of a cache with  $S=4$  and  $E=2$ . Label struct members of cache\_line\_t and memory type of each mem location: cache\_line\_t, cache\_set\_t, cache\_t

