Trace 1.din

L1 Size	Associativity	Block size	L1-I cache Miss rate	L1-D cache Miss rate	L1-I-CPI	L1-D CPI
16kb	1	32B	0.0311	0.064	2.866	4.624
16kb	2	32B	0.0224	0.0535	2.34	4.21
16kb	4	32B	0.0207	0.0511	2.242	4.066
16kb	1	64B	0.0225	0.0692	2.35	5.152
16kb	2	64B	0.0148	0.0528	1.888	3.168
16kb	4	64B	0.0137	0.0492	1.822	3.952

Trace 2.din

L1 Size	Associativity	Block size	L1-I cache Miss rate	L1-D cache Miss rate	L1-I-CPI	L1-D CPI
16kb	1	32B	0.0099	0.0235	1.5884	2.5368
16kb	2	32B	0.0051	0.0049	1.3066	1.2774
16kb	4	32B	0.0030	0.0040	1.1818	1.1402
16kb	1	64B	0.0067	0.0224	1.4642	2.5242
16kb	2	64B	0.0038	0.0034	1.1528	1.1784
16kb	4	64B	0.0024	0.0026	1.1505	1.442

Trace 3 .din

L1 Size	Associativity	Block size	L1-I cache Miss rate	L1-D cache Miss rate	L1-I-CPI	L1-D CPI
16kb	1	32B	0.0264	0.0257	2.584	2.542
16kb	2	32B	0.0192	0.0174	2.154	2.044
16kb	4	32B	0.0151	0.0143	1.906	1.858
16kb	1	64B	0.0184	0.0244	2.104	2.464
16kb	2	64B	0.0138	0.0148	1.828	1.888
16kb	4	64B	0.0111	0.0114	1.666	1.684

Trace 1.din

L1 and L2	Associativity	Block size	L1-I cache Miss rate	L1-D cache Miss rate	L2u miss rate	L1-I-CPI	L1-D CPI	L2 cpi
16kb	1	32B	0.0311	0.064	0.4568	1.0311	1.0640	1.45
16kb	2	32B	0.0224	0.0535	0.4538	1.022	1.05	1.45
16kb	4	32B	0.0207	0.0511	0.4435	1.020	1.05	1.44
16kb	1	64B	0.0225	0.0692	0.3630	1.225	1.0692	1.360
16kb	2	64B	0.0148	0.0528	0.3841	1.01	1.052	1.381
16kb	4	64B	0.0137	0.0492	0.3855	1.0137	1.0492	1.3855

Trace 2.din

L1 and L2	Associativity	Block size	L1-I cache Miss rate	L1-D cache Miss rate	L2u miss rate	L1-I-CPI	L1-D CPI	L2 cpi
16kb	1	32B	0.0099	0.0235	0.1605	1.099	1.0235	1.16
16kb	2	32B	0.0051	0.0049	0.3797	1.00	1.00	1.37
16kb	4	32B	0.0030	0.0963	0.5568	1.00	1.09	1.55
16kb	1	64B	0.0067	0.0224	0.1237	1.006	1.022	1.12
16kb	2	64B	0.0038	0.0034	0.3003	1.0038	1.0034	1.30
16kb	4	64B	0.0024	0.0026	0.4269	1.0024	1.0026	1.42

Trace 3.din

L1 Size	Associativity	Block size	L1-I cache Miss rate	L1-D cache Miss rate	L2u miss rate	L1-I-CPI	L1-D CPI	L2 cpi
16kb	1	32B	0.0264	0.0257	0.3964	1.02	1.0	1.3
16kb	2	32B	0.0192	0.0174	0.4340	1.02	1.1017	1.43
16kb	4	32B	0.0151	0.0143	0.5066	1.01	1.01	1.50
16kb	1	64B	0.0184	0.0244	0.3389	1.0184	1.0244	1.33
16kb	2	64B	0.0138	0.0148	0.3621	1.013	1.01	1.36
16kb	4	64B	0.0111	0.0114	0.4049	1.011	1.011	1.40

Calculating CPI

CPI= 1*Hit Rate +Miss Penalty*Miss Rate
Example

L1 i cache cpi : 1+60*0.0311=2.866
L2 D cache cpi 1+60*0.064=4.264

In this way values are calculated and filled in the above table

The best performing cache configurations with lowest cpi is

L1 16kb and L2 128kb Block size 64B having associativity 4

Screenshots of L1 Cache Traces

```
  GNU nano 4.8                                                                L1_Trace1.sh
#!/bin/bash

# Define configurations
cfg1="-l1-isize 16K -l1-ibsize 32 -l1-isbsize 32 -l1-iassoc 1 -l1-dsize 16K -l1-dbsize 32 -l1-dsbsize 32 -l1-dassoc 1"
cfg2="-l1-isize 16K -l1-ibsize 32 -l1-isbsize 32 -l1-iassoc 2 -l1-dsize 16K -l1-dbsize 32 -l1-dsbsize 32 -l1-dassoc 2"
cfg3="-l1-isize 16K -l1-ibsize 32 -l1-isbsize 32 -l1-iassoc 4 -l1-dsize 16K -l1-dbsize 32 -l1-dsbsize 32 -l1-dassoc 4"
cfg4="-l1-isize 16K -l1-ibsize 64 -l1-isbsize 64 -l1-iassoc 1 -l1-dsize 16K -l1-dbsize 64 -l1-dsbsize 64 -l1-dassoc 1"
cfg5="-l1-isize 16K -l1-ibsize 64 -l1-isbsize 64 -l1-iassoc 2 -l1-dsize 16K -l1-dbsize 64 -l1-dsbsize 64 -l1-dassoc 2"
cfg6="-l1-isize 16K -l1-ibsize 64 -l1-isbsize 64 -l1-iassoc 4 -l1-dsize 16K -l1-dbsize 64 -l1-dsbsize 64 -l1-dassoc 4"

# Define output file
output_file="outputL1Trace1.txt"

# Run Dinero IV for each configuration and append to output file
echo "Running Dinero IV for Trace1 with configurations:" >> "$output_file"
echo "-------------------------------------------------" >> "$output_file"

echo "Running Dinero IV with configuration: $cfg1" >> "$output_file"
./dineroIV -informat d $cfg1 < Trace1.din >> "$output_file"
echo "" >> "$output_file"

echo "Running Dinero IV with configuration: $cfg2" >> "$output_file"
./dineroIV -informat d $cfg2 < Trace1.din >> "$output_file"
echo "" >> "$output_file"

echo "Running Dinero IV with configuration: $cfg3" >> "$output_file"
./dineroIV -informat d $cfg3 < Trace1.din >> "$output_file"
echo "" >> "$output_file"

echo "Running Dinero IV with configuration: $cfg4" >> "$output_file"
./dineroIV -informat d $cfg4 < Trace1.din >> "$output_file"
echo "" >> "$output_file"

echo "Running Dinero IV with configuration: $cfg5" >> "$output_file"
./dineroIV -informat d $cfg5 < Trace1.din >> "$output_file"
echo "" >> "$output_file"

echo "Running Dinero IV with configuration: $cfg6" >> "$output_file"
./dineroIV -informat d $cfg6 < Trace1.din >> "$output_file"
echo "" >> "$output_file"

echo "-------------------------------------------------" >> "$output_file"

echo "Dinero IV execution completed. Check $output_file for results."
```

Output

```
  GNU nano 4.8                                                    outputL1Trace1.txt
Running Dinero IV for Trace1 with configuration: -l1-isize 16K -l1-ibsize 32 -l1-isbsize 32 -l1-iassoc 1 -l1-dsize 16K -l1-dbsize 32 -l1-dsbsize 32 -l1-dassoc 1-l1-isize 16K -l1-ibsize
Running Dinero IV for Trace1 with configuration: -l1-isize 16K -l1-ibsize 32 -l1-isbsize 32 -l1-iassoc 1 -l1-dsize 16K -l1-dbsize 32 -l1-dsbsize 32 -l1-dassoc 1$ cfg2 -l1-isize 16K -l1
Running Dinero IV for Trace1 with configuration: -l1-isize 16K -l1-ibsize 32 -l1-isbsize 32 -l1-iassoc 1 -l1-dsize 16K -l1-dbsize 32 -l1-dsbsize 32 -l1-dassoc 1$ cfg2 -l1-isize 16K -l1
Running Dinero IV for Trace1 with configurations:
-------------------------------------------------
Running Dinero IV with configuration: -l1-isize 16K -l1-ibsize 32 -l1-isbsize 32 -l1-iassoc 1 -l1-dsize 16K -l1-dbsize 32 -l1-dsbsize 32 -l1-dassoc 1
---Dinero IV cache simulator, version 7
---Written by Jan Edler and Mark D. Hill
---Copyright (C) 1997 NEC Research Institute, Inc. and Mark D. Hill.
---All rights reserved.
---Copyright (C) 1985, 1989 Mark D. Hill.  All rights reserved.
---See -copyright option for details

---Summary of options (-help option gives usage information).

-l1-isize 16384
-l1-dsize 16384
-l1-ibsize 32
-l1-dbsize 32
-l1-isbsize 32
-l1-dsbsize 32
-l1-iassoc 1
-l1-dassoc 1
-l1-irepl l
-l1-drepl l
-l1-ifetch d
-l1-dfetch d
-l1-dwalloc a
-l1-dwback a
-skipcount 0
-flushcount 0
-maxcount 0
-stat-interval 0
-informat d
-on-trigger 0x0
-off-trigger 0x0

---Simulation begins.
---Simulation complete.
l1-icache
 Metrics                    Total           Instrn           Data            Read           Write            Misc
 -----------------          ------          ------          ------          ------          ------          ------
 Demand Fetches             188702          188702               0               0               0               0
  Fraction of total         1.0000          1.0000          0.0000          0.0000          0.0000          0.0000

 Demand Misses                5873            5873               0               0               0               0
  Demand miss rate          0.0311          0.0311          0.0000          0.0000          0.0000          0.0000

 Multi-block refs                0
 Bytes From Memory          187936
 ( / Demand Fetches)        0.9959
                                                        [ Read 849 lines ]
^G Get Help       ^O Write Out      ^W Where Is       ^K Cut Text       ^J Justify        ^C Cur Pos        M-U Undo          M-A Mark Text     M-] To Bracket    M-Q Previous      ^B Back
```

‘