Rodney Wotton
CS 382 HW 4
Shudong Hao

1.
   a. Temporal locality: err, i, j, Anew[j][i], m, n
   b. Spatial locality: Anew, A
   c. The program would be slower because when iterating with i first, the code loses its spatial locality.

2.
   a.

Word Address	Binary Address	Tag	Index	Hit or Miss
0x43	0100 0011	0100	0011	Miss
0xc4	1100 0100	1100	0100	Miss
0x2b	0010 1011	0010	1011	Miss
0c42	0100 0010	0100	0010	Miss
0xc5	1100 0101	1100	0101	Miss
0x28	0010 1000	0010	1000	Miss
0xbe	1011 1110	1011	1110	Miss
0x05	0000 0101	0000	0101	Miss
0x92	1001 0010	1001	0010	Miss
0x21	0010 1010	0010	1010	Miss
0xba	1011 1010	1011	1010	Miss
0xbd	1011 1101	1011	1101	Miss

   b.

Word Address	Binary Address	Tag	Index	Offset	Hit or Miss
0x43	0100 0011	0100	001	1	Miss
0xc4	1100 0100	1100	010	0	Miss
0x2b	0010 1011	0010	101	1	Miss
0c42	0100 0010	0100	001	0	Hit

0xc5	1100 0101	1100	010	1	Hit
0x28	0010 1000	0010	100	0	Miss
0xbe	1011 1110	1011	111	0	Miss
0x05	0000 0101	0000	010	1	Miss
0x92	1001 0010	1001	001	0	Miss
0x21	0010 1010	0010	101	0	Hit
0xba	1011 1010	1011	101	0	Miss
0xbd	1011 1101	1011	110	1	Miss

3.

a.

Bit	Equation	Result
8	**30 x 8 x .05**	**12**
16	30 x 16 x .03	14.4
32	30 x 32 x .02	19.2
64	30 x 62 x .015	28.8
128	30 x 128 x .011	42.24

Best Bit rate block size: 8 bits

b.

Bit	Equation	Result
8	24 + 8 x .05	1.6
16	24 + 16 x .03	1.2
32	**24 + 32 x .02**	**1.12**
64	24 + 62 x .015	1.32
128	24 + 128 x .011	1.67

Best Bit rate block size: 32 bits

c. 128 bits.

4.

a. The Tag = 53 bits
The Index = 9 bits

The Offset = 2 bits

b. The Tag = 53 bits
   The Index = 6 bits
   The Offset = 5 bits

c.
   i. The ratio is 11/64
   ii. The ratio is 11/64

d. The Tag = 57
   The Index = 4
   The Offset = 3

5.

	TAG	DATA	TAG	DATA	TAG	DATA	TAG	DATA
0	0001 0100	Memory [0x143]	0010 0010	Memory [0x22b]	0010 1010	Memory [0x2a2]	0011 1011	Memory [0x3ba]
1	0100 1001	Memory [0x492]	0100 0010	Memory [0x42f]		Memory []		Memory []
2	1011 0010	Memory [0xb2d]		Memory []		Memory []		Memory []
3	1100 0100	Memory [0xc4a]		Memory []		Memory []		Memory []