6.823 Computer Architecture	DUE: 3/13/2002
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Problem Set 3	*Instructors: Krste Asanovic, Srinivas Devadas*

Problem 2

(a)

Address within Bank	BANK 0	BANK 1	BANK 2	BANK 3	BANK 4
`0x00`	$a[0][0]$	$a[2][4]$		$a[1][2]$	
`0x04`		$a[0][1]$	$a[2][5]$		$a[1][3]$
`0x08`	$a[1][4]$		$a[0][2]$	$a[3][0]$	
`0x0C`		$a[1][5]$		$a[0][3]$	$a[3][1]$
`0x10`	$a[3][2]$		$a[2][0]$		$a[0][4]$
`0x14`	$a[0][5]$	$a[3][3]$		$a[2][1]$	
`0x18`		$a[1][0]$	$a[3][4]$		$a[2][2]$
`0x1C`	$a[2][3]$		$a[1][1]$	$a[3][5]$	

(b)

1. CPI with given system and miss rate 3% :
   CPI = 1.5 + 0.03*1.2*(4+24+4) = 2.652

2. CPI with two word cache and miss rate 2% :
   Now everythime a miss happens, the cache needs to update two words and therefore
   CPI = 1.5 + 0.02*1.2*2*32 = 3.036

3. CPI with four word cache and miss rate 1% :
   Now everythime a miss happens, the cache needs to update four words and therefore
   CPI = 1.5 + 0.01*1.2*4*32 = 3.036

4. Advantages/Disadvantages of the larger block size:
   Large block size reduces the miss rate, but at the same time increase the average CPI.