Steven Kravitsky
CS 260

Homework 7

1)

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Def equivalent():
	A = set.init(1..n)
	For i in range(1,n):
		for j in range(i+1, len(A)):
			if A[j] == A[j-1]:
				set.Merge(A,j,j-1)
			Else:
				If( Find(A,j)%2 == 0 && Find(A, j-1)%2==0):
					Test1 = True
				Elif( Find(A,j)%2 != 0 && Find(A, j-1)%2 != 0):
					Test1 = True
				Else:
					Test1 = False

				If( Find(A,transitions[j,0])%2==0 && Find(A,transitions[j-1,0])%2==0):
					Test2 = True
				Elif( Find(A,transitions[j,0])%2!=0 && Find(A,transitions[j-1,0])%2!=0):
					Test2 = True
				Else:
					Test2 = False

				If( Find(A,transitions[j,1])%2==0 && Find(A,transitions[j-1,1])%2==0):
					Test3 = True
				Elif( Find(A,transitions[j,1])%2!=0 && Find(A,transitions[j-1,1])%2!=0):
					Test3 = True
				Else:
					Test3 = False

				If Test1 or (test2 and test 3):
					set.Merge(a,j,j-1)
	return A
```

2)
If you take a graph with the base of m = 0, then you can take a single vertex and show that it has 0 edges with a degree of 0. This means that the sum[1..n](di) = 2m, since 2 * 0 = 0

A similar assumption can be made when m = k. If we add one edge to the graph then we must connect it between two nodes. Each node will have their degree go up by one, increasing the total degree by 2. This would make the equation sum[1..n](di) + 2 = 2(m+1). By factoring and subtracting 2 on each side you get sum[1..n](di) = 2k.

3)
The base case is a tree with a single vertex. This vertex has 0 in-degrees and 0 out-degrees. Which means the in-degrees and out-degrees are equal.

4)

	A	B	C	D	E	F
A		3		4		5
B			1			1
C				2		
D		3				
E				3		2
F				2