

CS 280 Grading Guide

Assignment 11

Section 7.5

12) The common mistake was saying that for an Euler path there need to be two vertices with odd degree. The reason was Theorem 2. However, a circuit is also a path, so Theorem 2 doesn't apply here. Instead, we note that each vertex had even degree, and thus a circuit and therefore a path exist.

20) Some people forgot to take into account the pointy part of the figure (i.e. the part of the vertical bar that comes out of the squares). Then, they claimed that no path exists, since there aren't two nodes of odd degree. Once again, if you did that, a circuit is also a path. Also, actually explaining how to draw the thing without any thought whatsoever is not a really good solution!

36) a) Most people got this question correctly. However, for some unexplained reason, people decided that K_1 does not have an Euler circuit. It does. Be careful on boundary cases, and read the definitions more carefully.

36) d) Most people got this question correctly.

38) Paths) The most common error was not to include the answer for circuits. Again, a circuit is also a path!! Finally, $K_{1,1}$ also has an Euler path, but almost nobody actually wrote that. Most people had the answer where $n=2$ or $m=2$.

Section 7.6

7.6 6) 3pts for each part. For each part, -1 for having only the length but not the actual path, -1/2 for having the length worked out on a graph but no final answer.

7.6 18) 4 pts total. 1 for answer, 3 for explanation/proof. You can get up to 1 pt for getting the wrong answer but having something reasonable.

Section 7.7

7.7 6) 4 pts total. 1 for saying that it is planar, 3 for the drawing.

7.7 16) 6 pts total. 3 for the answer, 3 for the explanation/proof. 1 pt for just using Euler's formula.

Section 7.8

12. (5 marks)

Full credit for using the 4-color map theorem to solve the problem

Full credit for giving a specific example for which at least 4 colors are

needed

1 mark given if the 4-color map theorem is used but the *wrong* chromatic number is obtained.

14. (5 marks)

Full credit for any explanation which sufficiently shows that 2 colors are not enough to color a circuit containing an odd number of nodes

Full credit for any explanation which recognizes that at least 3 colors are required

16. (5 marks)

3 marks for drawing or describing the graph representing stations and distances.

2 marks for *using this graph* to obtain the correct chromatic number (4)

20. (5 marks)

2 marks for part (c)

1 mark for each case; if the answer does not consist of 1 case, 1 mark is taken off

3 marks for part (d)

1 mark for getting the correct edge chromatic number (3)

1 mark for explaining *why* there must be *at least* n colors used.

1 mark for explaining *why n colors are sufficient* (i.e. not more than n colors are required)

Note: Many students correctly got n , but could not satisfactorily explain why this must be so. It is important to see that there must be at least n colors used (since the central node has n outgoing edges), but it is equally important to explain how the wheel (the circumference of the wheel, especially) can be colored using at most n colors, so not more than n colors are required.