Discrete Optimization

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Name:

1 Assignment-2

Due: Wednesday, Sep. 15

Please submit your answer in a neat, readable properly organized format.

In general, a * in exercises indicates a more challenging problem, ** a highly challenging problem.

1. **Compare the prism over the $5-prism$ with the prism over the Petersen graph. Which will you consider as a better topology for a network with 20 computers?**
2. **15 students meet at a party. As it happens, if you check any pair of students, you'll find out that there is exactly one other student who is a friend of both of them.**
   Construct a graph whose vertices are the 15 students, and connect two vertices (students) by an edge if they are friends.
3. *** Prove that in any party with this property there must be a student who is a friend of all the other students.**
4. **Is it possible to design a network topology of diameter 3 for 20 computers where each computer is connected to 4 other computers?**
   What if you can connected only one computer to 5 other computers?
5. **Prove that if a cubic graph is Hamiltonian then its chromatic index is 3.**
6. **What is the largest independent set and the smallest cycle you can find in the graph cubic28.**

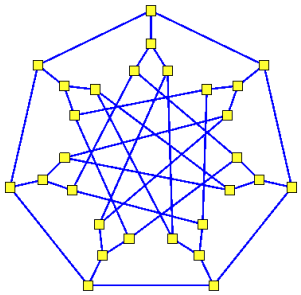

Figure 1: cubic28