

UW Math Circle

Homework

1. Thorin has declared that Dwalin, Balin, Bifur, Bofur, Oin, and Gloin each are to be sent to a dominion to watch over the treasure hordes there. The dominions that need a guard are Belegost, Glittering Caves, Iron Hills, Nogrod, Gundabad and Dunland. Each dwarf has rated the dominions and the current residents of each dominion have also rated the dwarves. In each rating, 1 is the most preferred and 6 is the least preferred. You may assume that the happiness associated to each rating is the same for each dwarf and dominion. Where should each dwarf go to maximize everyone's happiness? How did you decide this?

Dwalin	Balin	Bifur	Bofur	Oin	Gloin
1. Dunland	1. Glittering Caves	1. Dunland	1. Gundabad	1. Glittering Caves	1. Iron Hills
2. Iron Hills	2. Gundabad	2. Nogrod	2. Iron Hills	2. Iron Hills	2. Belegos
3. Nogrod	3. Nogrod	3. Belegos	3. Glittering Caves	3. Gundabad	3. Nogrod
4. Belegos	4. Iron Hills	4. Iron Hills	4. Belegos	4. Dunland	4. Gundabad
5. Glittering Caves	5. Belegos	5. Glittering Caves	5. Nogrod	5. Belegos	5. Dunland
6. Gundabad	6. Nogrod	6. Gundabad	6. Dunland	6. Nogrod	6. Glittering Caves
Belegos	Glittering Caves	Iron Hills	Nogrod	Gundabad	Dunland
1. Bifur	1. Dwalin	1. Gloin	1. Oin	1. Bifur	1. Bofur
2. Oin	2. Bofur	2. Bofur	2. Bifur	2. Bofur	2. Gloin
3. Dwalin	3. Balin	3. Oin	3. Bofur	3. Oin	3. Dwalin
4. Balin	4. Bifur	4. Balin	4. Dwalin	4. Gloin	4. Balin
5. Gloin	5. Gloin	5. Bifur	5. Gloin	5. Balin	5. Oin
6. Bofur	6. Oin	6. Dwalin	6. Balin	6. Dwalin	6. Bifur