

MATH 2590 – Thinking Mathematically
Professor: Mike Zabrocki

Kidney Transplant and Math

Exercise:

Now it is your turn to draw the graph. This exercise is a very simplified form of the graph theory demonstrated above. Its goal is to give you an idea of how they match pairs in a way that satisfies most of the patients in need of kidneys. In order to complete this exercise, you will need to refer to *the Red Blood Cell Compatibility Table* shown below in figure 4.

Red blood cell compatibility table

Recipient	Donor							
	O-	O+	A-	A+	B-	B+	AB-	AB+
O-	✓							
O+	✓	✓						
A-	✓		✓					
A+	✓	✓	✓	✓				
B-	✓				✓			
B+	✓	✓			✓	✓		
AB-	✓		✓		✓		✓	
AB+	✓	✓	✓	✓	✓	✓	✓	✓

Figure 4: Blood Type
 (Source: http://en.wikipedia.org/wiki/Blood_type)

☒ First, look at the donor/recipient blood type information below

Donor-Recipient	Donor Blood Type	Recipient Blood Type
Pair I	B ⁺	A ⁺
Pair II	B ⁻	O ⁺
Pair III	A ⁺	B ⁺
Pair IV	O ⁺	AB ⁻

Note: According to the Red Blood Cell Compatibility Table above, all these pairs are incompatible.

☒ Second, draw a circular graph with 4 nodes, each node representing a pair.

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- ☒ Third, look at the recipient/donor blood types and then try to match them. To make it easier, let us draw a table that shows all possible matches regardless of the recipient's blood type.

Donor Blood Type	All Possible Match	Possible Recipients
i.e. D ₁ : B ⁺	B ⁺ , AB ⁺	R ₃ (B ⁺)
D ₂ : B ⁻	___, ___, ___, ___	___
D ₃ : A ⁺	___, ___	___
D ₄ : O ⁺	___, ___, ___, ___	___

- ☒ Finally, connect all possible matches.