(O) Warlpiri Kinship Groups (1/4)

O1. Nakamarra

O2. Nampijinpa

O3. Napanangka

O4. Nungarrayi

O5. Napaljarri

O6. Napangardi

O7. Napurrula (note: this is not a typo)

O8. Nangala

This is just one way to solve this problem. This solution is shown here to illustrate the variety of ways in which one can approach such a problem.

Preliminary observations.
We are given that for skin number 1, the males are Jakamarra and the females are Nakamarra. The only different between these two names is the first letter. When we look at the clues, all skin names seem to follow this pattern: to get from a female in a skin group to a male in the same group, we change the first letter from N to J. There is one exception: "Napurrula" becomes "Jupurrula."

We already know Nakamarra is assigned to skin 1, so we just need to figure out the remaining seven:
1. Nampijinpa
2. Napangardi
3. Napurrula
4. Napanangka
5. Napaljarri
6. Nangala
7. Nungarrayi

Basic skin relations.
As we see in the diagram in the problem, the Warlpiri people have an intricate kinship system. (In fact, so do many other Australian aboriginal groups!) Let's figure out how to navigate this system.

To get from husband to wife and vice versa, we simply move to the other side of the row. For example, the husband of someone in group 4 is in group 8. An shorter way to write this is: 8 = 4 Husb. The right side means to start with 4 and apply the "husband" function, which goes across the row and gives 8.

To get from mother to child, we move along an arrow. For example, the child of mother in 2 is 3. We represent this relation as 3 = 2 M2C, where "M2C" is the "mother to child" function.

(O) Warlpiri Kinship Groups (2/4)

Inverses.
The two functions Husb and M2C have inverses. We define a function called Wife. Note that it does the exact same thing as Husb – going across the row. We also define a "child to mother" function, C2M. To get from child to mother, we along an arrow, against its direction. For example, the mother of 3 is 2, so we write 2 = 3 C2M.

Composition of skin relations.
We can apply one skin relation after another.

How do we get from father (person A) to child (person B)? We note that the relation is this: B is A's wife's child, which we write this as B = A Wife • M2C, where the dot (•) just means do one function after the other. For example, if the father is in group 8, we have B = (8 Wife) M2C = 4 M2C = 2, so the child is in group 2.

What is the relation in skin group between two siblings? Although it is not stated in the problem explicitly, we know that siblings must be in the same skin group. This is because they have the same mother. We'll still define a sibling function, "Sib." It is just the identity.

Onto solving the problem!
Now that we understand the kinship rules better, we can move on to the problem. Here are the six clues, numbered so that they are easier to refer to.

1. "I am a Jangala. My daughter is Nampijinpa."
2. "I am a Nakamarra. My brother's son is Jupurrula."
3. "I am a Nampijinpa. My mother's grandfathers were Jungarrayi and Jupurrula."
4. "I am a Napangardi. My husband's sister's husband's father's father's mother was Napurrula."
5. "I am a Napanangka. Some of my good friends are Napaljarri and Nangala and Nungarrayi. Oh, you wanted me to talk about my family? Oops."
6. "I am a Japanangka. My wife's father's mother's brother's wife's father's mother's brother's wife's father's mother's brother's wife's father's mother's brother's wife's father's mother's brother's wife's father's mother's brother's wife was Napurrula. I know my family tree very well."

Step 1. We should start with (ii), since we know Nakamarra is 1. If the speaker is group A and the person she is describing is group B, then we have the relation B = A Sib • Wife • M2C. Setting A = 1, we have

1 (start) → applying Sib → 1 → applying Wife → 5 → applying M2C → 7

So Japurrula is the male version of 7.

Step 2. Next, we move on to (iv). We know that B is group 7, and we want to figure out what A is. One nice way is to invert the relation: B is female and A is B's son's son's son's wife's brother's wife: so we get

B = A Husb • Sib • Husb • C2M • Husb • C2M • Husb • C2M (original relation)
A = B M2C • Wife • M2C • Wife • M2C • Wife • Sib • Wife (inverted)

(O) Warlpiri Kinship Groups (3/4)

This gives

7 (start) → M2C → 6 → Wife → 2 → M2C → 3 → Wife → 7 → M2C → 6 → Wife → 2 → Sib → 2 → Wife → 6

So Napangardi is the female version of 6.

<u>Step 3.</u> Let's move on to (vi). It looks long but there is one key observation we can make: the relation "wife's father's mother's brother's" appears over and over again. (Each time, we start with a male.)

Is there anything special about this? Yes! The composition Wife • C2M • Husb • C2M • Sib always gets you back to where you started! In other words, it is just the identity function.

We have

B = A (Wife • C2M • Husb • C2M • Sib) • (Wife • C2M • Husb • C2M • Sib) • (Wife • C2M • Husb • C2M • Sib) • (Wife • C2M • Husb • C2M • Sib) • (Wife • C2M • Husb • C2M • Sib) • (Wife • C2M • Husb • C2M • Sib) • Wife

but we can cross out every pair in parentheses, leaving us with B = A Wife, so A = B Husb = 7 Husb = 3. Thus, Japanangka is the male version of group 3. That wasn't too bad!

<u>Step 4.</u> On to (iii): "I am a Nampijinpa. My mother's grandfathers were Jungarrayi and Jupurrula."

Let X and Y be the skin groups for Jungarrayi and Jupurrula, respectively. (We know that Y = 7.) A's mother's grandfather's are A C2M • C2M • C2M • Husb (maternal grandfather) and A C2M • C2M • Husb • C2M • Husb (paternal grandfather). We don't know which is X and which is Y. Thus, we have either

A = X Wife • M2C • M2C • M2C
A = Y Wife • M2C • Wife • M2C • M2C

or

A = Y Wife • M2C • M2C • M2C
A = X Wife • M2C • Wife • M2C • M2C

Using the fact that Y = 7, the former gives A = 6, which is not possible, because we already know the skin name for 6. The latter gives A = 2 and X = 4, and this must be correct. This gives us the names for 2 and 4.

<u>Step 5.</u> Now, only 5 and 8 need to be determined. We can use (i), which tells us that Jangala is the male name for group 8.

<u>Step 6.</u> Finally, (v) tells us that the final name is Napaljarri, and this goes in group 5.

(O) Warlpiri Kinship Groups (4/4)

Hidden mathematics

The kinship system can be explained in terms of a mathematical group, which is a concept in abstract algebra. The M2C and Husb functions together generate the dihedral group of order eight! The M2C function corresponds to a 90-degree rotation, and the Husb function corresponds to a reflection.

Further reading

For more information about Australian Aboriginal kinship systems, see chapter 2 of *Language And Culture in Aboriginal Australia*, edited by Michael Walsh and Colin L. Yallop.

Source: http://goo.gl/cmhSt

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