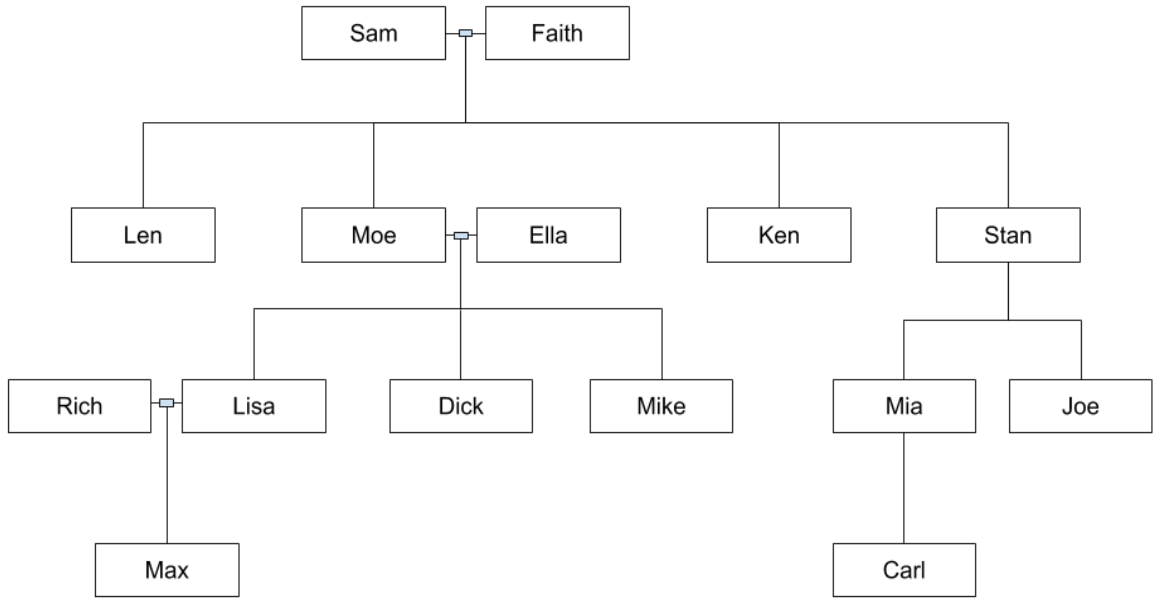
American Computer Science League

2020 Finals ● Program 4: Family Tree ● Senior Division

PROBLEM: Given a set of parent-child relationships, report how two individuals are related. Consider the following set of parent-child relationships:

Sam, Len Sam, Moe Faith, Moe Sam, Ken Faith, Stan Moe, Lisa Moe, Dick Moe, Mike Ella, Lisa Stan, Mia Stan, Joe Lisa, Max Rich, Max Mia, Carl	

Sam is married to Faith; they have 4 children: Len, Moe, Ken, and Stan. Moe is married to Ella, and they have 3 children: Lisa, Dick, and Mike. Lisa is married to Rich and has one child, Max. Stan has two children: Mia and Joe. Mia has one child: Carl, and there is no spouse given for Mia or for Stan.

Because we are not giving the gender of any person, we will use *pibling* rather than aunts and uncles, and *nibling* rather than nieces and nephews. Also, there is no distinction between "in-laws". For example, Ella, the spouse of Moe, has the exact same parents, siblings, etc. as Moe has.

Here are examples of the relationship of two people in the example above:

Sam is Moe's parent
Faith is Mike's grandparent
Lisa is Sam's grandchild
Dick and Mia are cousins
Rich and Joe are cousins
Dick is Max's nibbling

Carl and Max are second cousins
Sam is Carl's great-grandparent

We guarantee that the input data will be a valid family tree with at most 10 generations. All siblings have the same parents, and a parent will have no more than 5 children. A person has at most 2 parents, and siblings cannot marry each other.

The relationships that will be tested are as follows:

- **spouse**
- **parent, grandparent, great-grandparent** - direct lineage
- **child, grandchild, great-grandchild** - direct lineage
- **sibling** - individuals with the same parents
- **cousin** - individuals whose parents are siblings
- **second cousin** - individuals whose parents are cousins
- **pibling**- Tom is a pibling of Bob, if Tom is a sibling of one of Bob's parents
- **grandpibling** - Ann is a grandpibling of Bob, if Ann is a sibling of one of Bob's grandparents
- **nibling** - Fran is a nibling of Betty, if one of Fran's parents is a sibling of Betty
- **grandnibling** - Ned is a grandnibling of Joy, if one of Ned's grandparents is a sibling of Joy

INPUT: A set of family trees with relationships to report about each tree. For each data set, there will be a number representing how many parent-child relationships to read in followed by the family tree data which is a set of parent-child relationships, one relationship per line. This will be followed by a number representing the number of outputs requested. For each output requested, the relationships data will be a pair of names in the family tree, one relationship per line.

OUTPUT: For each relationship line, report the relationship of the second person to the first. There will be 10 relationships to report. We guarantee that the relationship will be one of the above.

Output is being scored by a computer, so you must print the relationships exactly as they appear above: all lowercase letters, spelled as above, a single space between the words in *second cousin*, a dash (with no spaces) in *great-grandparent*, and *great-grandchild*.

The Sample Data below shows 3 family trees. The first one is a tree with 5 people. The 2nd and 3rd are the tree above, with the relationships expressed differently.

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SAMPLE INPUT (shown in 3 columns):

```
4
Moe Lisa
Moe Dick
Moe Mike
Ella Mike
2
Moe Ella
Mike Ella
```

```
14
Sam Len
Sam Moe
Faith Moe
Sam Ken
Faith Stan
Moe Lisa
Moe Dick
Moe Mike
Ella Lisa
Stan Mia
Stan Joe
Lisa Max
Rich Max
Mia Carl
4
Dick Max
Mike Faith
Faith Mike
Carl Ken
```

```
14
Ella Lisa
Mia Carl
Ella Dick
Lisa Max
Faith Ken
Rich Max
Sam Ken
Moe Lisa
Sam Stan
Stan Mia
Sam Moe
Faith Len
Ella Mike
Stan Joe
4
Max Carl
Mike Joe
Rich Mike
Dick Stan
```

SAMPLE OUTPUT:

1. spouse
2. parent
3. nibling
4. grandparent
5. grandchild
6. grandpibling
7. second cousin
8. cousin
9. sibling
10. pibling

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TEST INPUT (shown in 3 columns):

```
10
Pat Rich
Rich Jo
Pat Robin
Sam Rich
Pat Quinn
Robin Dale
Robin Bobby
Noel Bobby
Jo Lynn
Quinn Max
2
Sam Lynn
Bobby Sam
```

```
10
Robin Dale
Pat Robin
Sam Rich
Pat Quinn
Pat Rich
Robin Bobby
Noel Bobby
Jo Lynn
Quinn Max
Rich Jo
3
Quinn Lynn
Lynn Sam
Dale Jo
```

```
20
Zion Pat
Zion Rich
Rich Hayden
Pat Max
Logan Pat
Zion Wyatt
Wyatt Quinn
Quinn Robin
Terry Max
Hayden Alex
Alex Noel
Faith Robin
Quinn Kaden
Max Jesse
Robin Brook
Sam Noel
Max Dale
Sam Emory
Quinn Val
Noel Gabriel
5
Val Robin
Rich Emory
Jesse Wyatt
Dale Robin
Pat Kaden
```

TEST OUTPUT:

1. great-grandchild
2. grandparent
3. grandnibling
4. great-grandparent
5. cousin
6. sibling
7. great-grandchild
8. grandpibling
9. second cousin
10. grandnibling

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SAMPLE INPUT for HackerRank:

```
4
Moe Lisa
Moe Dick
Ella Lisa
Ella Mike
Ella Moe
14
Sam Len
Sam Moe
Faith Moe
Sam Ken
Faith Stan
Moe Lisa
Moe Dick
Moe Mike
Ella Lisa
Stan Mia
Stan Joe
Lisa Max
Rich Max
Mia Carl
Dick Max
14
Ella Lisa
Mia Carl
Ella Dick
Lisa Max
Faith Ken
Rich Max
Sam Ken
Moe Lisa
Sam Stan
Stan Mia
Sam Moe
Faith Len
Ella Mike
Stan Joe
Rich Ella
```

SAMPLE OUTPUT:

1. spouse
2. nibling
3. parent

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TEST INPUT for HackerRank:

```
10
Pat Rich
Rich Jo
Pat Robin
Sam Rich
Pat Quinn
Robin Dale
Robin Bobby
Noel Bobby
Jo Lynn
Quinn Max
Sam Lynn
10
Robin Dale
Pat Robin
Sam Rich
Pat Quinn
Pat Rich
Robin Bobby
Noel Bobby
Jo Lynn
Quinn Max
Rich Jo
Max Noel
20
Zion Pat
Zion Rich
Rich Hayden
Pat Max
Logan Pat
Zion Wyatt
Wyatt Quinn
Quinn Robin
Terry Max
Hayden Alex
Alex Noel
Faith Robin
Quinn Kaden
Max Jesse
Robin Brook
Sam Noel
Max Dale
Sam Emory
Quinn Val
Noel Gabriel
Val Robin
20
Robin Dale
Pat Robin
Sam Rich
Kris Andy
Stacy Lynn
Pat Quinn
Max Lee
Val Jordan
Pat Rich
Robin Bobby
Quinn Max
Noel Bobby
Jo Lynn
Rich Jo
Izzy Max
Sam Taylor
Val Jo
Dale Andy
Izzy Casey
Lynn Jamie
Noel Andy
20
Quinn Val
Rich Hayden
Pat Max
Max Dale
Logan Pat
Zion Wyatt
Quinn Robin
Terry Max
Sam Emory
Zion Rich
Hayden Alex
Noel Gabriel
Sam Noel
Faith Robin
Quinn Kaden
Max Jesse
Zion Pat
Wyatt Quinn
Robin Brook
Sam Noel
Val Logan
15
Pat Rich
Rich Jo
Pat Robin
Sam Rich
Pat Quinn
Robin Dale
Robin Bobby
Noel Bobby
Jo Lynn
Quinn Max
Casey Jo
Bobby Kris
Alex Max
Jo Jesse
Val Kris
Lynn Noel
15
Pat Rich
Robin Dale
Rich Jo
```

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```
Noel Bobby
Jo Lynn
Robin Bobby
Quinn Max
Pat Robin
Casey Jo
Sam Rich
Pat Kris
Bobby Kris
Alex Max
Pat Quinn
Jo Jesse
Kris Noel
20
Zion Pat
Zion Rich
Rich Hayden
Pat Max
Logan Pat
Zion Wyatt
Wyatt Quinn
Quinn Robin
Terry Max
Hayden Alex
Alex Noel
Faith Robin
Quinn Kaden
Max Jesse
Robin Brook
Sam Noel
Max Dale
Sam Emory
Quinn Val
Noel Gabriel
Wyatt Sam
20
Robin Dale
Pat Robin
Sam Rich
```

```
Kris Andy
Stacy Lynn
Pat Quinn
Max Lee
Val Jordan
Pat Rich
Robin Bobby
Quinn Max
Noel Bobby
Jo Lynn
Rich Jo
Izzy Max
Sam Taylor
Val Jo
Dale Andy
Izzy Casey
Lynn Jamie
Jordan Casey
20
Rich Hayden
Sam Emory
Pat Max
Quinn Robin
Logan Pat
Zion Wyatt
Wyatt Quinn
Terry Max
Hayden Alex
Alex Noel
Zion Pat
Faith Robin
Quinn Kaden
Max Jesse
Zion Rich
Robin Brook
Sam Noel
Max Dale
Quinn Val
Noel Gabriel
```

```
Alex Kaden
```

TEST OUTPUT:

1. great-grandchild
2. pibling
3. sibling
4. grandchild
5. great-grandparent
6. grandpibling
7. grandparent
8. grandnibling
9. cousin
10. second cousin