

Problem 244: Ship Refueling

Difficulty: Hard

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Problem Background

Every branch of the military is expected to maintain combat readiness at all times. In one regard, this preparedness is even more critical for the Navy. Ships require large amount of fuel in order to operate, and there aren't any gas stations floating around in the middle of the ocean! A ship that runs out of fuel could find itself adrift and in a great deal of trouble, even if they're not actively involved in a combat situation.

To help address these concerns, many navies employ replenishment oilers, vessels that carry huge amounts of fuel and supplies and the equipment needed to transfer both to another ship while at sea. These ships greatly improve a navy's ability to deploy its fleets over large distances, as they need not rely quite so heavily on land-based ports for resupply. These ships typically also serve as command ships for admirals and fleet commanders, due to their ability to support other vessels and their lack of direct involvement in combat situations.



The HMAS Sirius (Royal Australian Navy, right) refuels the USS Juneau (United States Navy, left) while at sea.

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Problem Description

Your team is working with the captain of the *HMAS Sirius*, pictured above, to manage a remote refueling operation for allied ships in the area. You will be given a tactical readout of ships in the vicinity and must determine which ships should be refueled and in what order. Allied vessels should be refueled before any neutral vessels receive any fuel (and hostile vessels can be ignored entirely); within each of those categories, ships should be prioritized based on the amount of fuel they have remaining (those with the least amount of fuel remaining should be addressed first).

Ships will be resting at anchor while they wait to be refueled, so they won't be moving from their reported positions while waiting for the *Sirius* to arrive. However, they still have to burn some fuel in order to continue generating power for other ship's systems. You may not be able to reach all ships before they run out of fuel, but fortunately there are other replenishment oilers in the area; if the *Sirius* cannot get to a ship before it runs out of fuel, don't include it in your schedule. You can assume

the *Sirius* carries enough fuel to resupply all the vessels it is able to reach. Each refueling operation will take 30 minutes to complete, once the *Sirius* arrives at the target ship.

Sample Input

The first line of your program's input, received from the standard input channel, will contain a positive integer representing the number of test cases. Each test case will include:

- A line containing the following information about the *HMAS Sirius*, separated by spaces:
 - A positive decimal value, representing the *Sirius*' cruising speed in kilometers/hour
 - An integer value, representing the *Sirius*' initial X coordinate (in kilometers)
 - An integer value, representing the *Sirius*' initial Y coordinate (in kilometers)
 - A positive integer value, *S*, representing the number of ships on the *Sirius*' radar
- *S* lines, each containing the following information about the ships in the area that require refueling, separated by spaces:
 - A string containing upper- and lowercase letters, representing the name of the ship
 - A string, either "Allied", "Neutral", or "Hostile", representing the disposition of the ship
 - An integer value, representing the ship's X coordinate (in kilometers)
 - An integer value, representing the ship's Y coordinate (in kilometers)
 - A positive decimal value, representing the ship's remaining fuel (in liters)
 - A positive decimal value, representing the ship's fuel burn rate (in liters/hour)

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2
24.4 -14 -74 6
Wollongong Allied 57 59 228.8 39.2
Gladiator Neutral 45 -29 685.5 15.7
UnidentifiedA Hostile -71 77 227.2 30.6
Mermaid Allied 35 54 731.0 41.2
Norman Allied -68 6 963.0 32.6
Sydney Allied -31 -2 834.6 33.1
25.7 81 -62 6
UnidentifiedA Hostile -6 -38 943.7 28.3
UnidentifiedB Hostile -50 62 271.6 20.9
Stuart Allied 83 20 786.6 45.7
Independence Neutral 69 17 985.4 12.3
Parramatta Allied -29 -51 513.1 38.0
Glenelg Allied 9 76 694.7 27.9
```

Sample Output

For each test case, your program must print the names of each ship the *Sirius* should refuel, one per line, in the order in which they should be refueled. Ships which are not refueled by the *Sirius* should be omitted.

Mermaid
Sydney
Norman
Gladiator
Parramatta
Glenelg
Stuart
Independence