

Problem 3 – The Heigan Dance

At last, level 80. And what do level eighties do? Go raiding. This is where you are now – trying not to be wiped by the famous dance boss, Heigan the Unclean. The fight is pretty straightforward - dance around the Plague Clouds and Eruptions, and you'll be just fine.

Heigan's chamber is a 15-by-15 two-dimensional array. The player always starts at the **exact center**. For each turn, Heigan uses a spell that hits a certain cell and the neighboring **rows/columns**. For example, if he hits (1,1), he also hits (0,0, 0,1, 0,2, 1,0 ... 2,2). If the player's current position is within the area of damage, the player tries to move. First he tries to move **up**, if there's **damage/wall**, he tries to move **right**, then **down**, then **left**. If he **cannot move** in any direction, because **the cell is damaged** or there is a **wall**, the player **stays** in place and takes the damage.

Plague cloud does 3500 damage **when it hits**, and 3500 damage **the next turn**. Then it **expires**. **Eruption** does 6000 damage **when it hits**. If a spell will hit a player that also has an active Plague Cloud from the previous turn, the **cloud** damage is applied **first**. **Both** Heigan and the player **may** die in the same turn. If Heigan is **dead**, the spell he **would** have casted is **ignored**.

The player always starts at **18500** hit points; Heigan starts at **3,000,000** hit points. **Each** turn, the player does damage to Heigan. The fight is over either when the player is **killed**, or Heigan is **defeated**.

Input

- On the first line you receive a floating-point number **D** – the damage done to Heigan each turn
- On the next several lines – you receive input in format **{spell} {row} {col}** – **{spell}** is either **Plague** or **Eruption**

Output

- On the first line
 - If Heigan is defeated: **"Heigan: Defeated!"**
 - Else: **"Heigan: {remaining}"**, where remaining is rounded to two digits after the decimal separator
- On the second line:
 - If the player is killed: **"Player: Killed by {spell}"**
 - Else **"Player: {remaining}"**
- On the third line: **"Final position: {row, col}"** -> the last coordinates of the player.

Constraints

- D** is a floating-point number in range [0 ... 500000]
- A damaging spell will always affect at least one cell
- Allowed memory: 16 MB
- Allowed working time: 0.25s

Examples

Input	Output
10000 Cloud 7 7 Eruption 6 7 Eruption 8 7 Eruption 8 7	Heigan: 2960000.00 Player: Killed by Eruption Final position: 8, 7
Input	Output

500000 Cloud 7 6 Eruption 7 8 Eruption 7 7 Cloud 7 8 Eruption 7 9 Eruption 6 14 Eruption 7 11	Heigan: Defeated! Player: 12500 Final position: 7, 11
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Input	Output
12500.66 Cloud 7 7 Cloud 7 7 Cloud 7 7 Cloud 7 7	Heigan: 2949997.36 Player: Killed by Plague Cloud Final position: 7, 7