## 01. Science Experimentation

*You are a scientist conducting experiments. Follow protocols to mix chemicals, observe reactions, and document results to make groundbreaking discoveries. Each experiment involves a series of steps and specific chemical requirements.*

On the first line of the standard input, you will receive an integer **n** – the number of chemicals available in your lab.

On the next **n** lines, the chemical details will follow with their names and quantities separated by a hashtag in the following format:

"{chemical name} # {quantity}"

Chemical quantity represent the current quantity in the lab, ranging from 0 to 500.

After you have your chemicals listed, you will receive different commands, each on a new line, separated by **" # "**, until the "End" command is given. There are three actions you can perform:

"Mix # {chemical name 1} # {chemical name 2} # {amount}"

* Mix a specified amount of two chemicals together to observe a reaction.
* If the amount of both chemicals is sufficient to be mixed, **reduce** the amount of both chemicals and **print**:

"{chemical name 1} and {chemical name 2} have been mixed. {amount} units of each were used."

* If either chemical does not have enough quantity, **print**:

"Insufficient quantity of {chemical name 1}/{chemical name 2} to mix."

"Replenish # {chemical name} # {amount}"

* Replenish the quantity of a specific chemical.
* If chemical does not exist, **print**:

"The Chemical {chemical name} is not available in the lab."

* If the replenishment brings the quantity **above** the maximum storage capacity of 500 units, set the quantity to 500 units and **print**:

"{chemical name} quantity increased by {addedAmount} units, reaching maximum capacity of 500 units!"

* Otherwise, **print**:

"{chemical name} quantity increased by {amount} units!"

" Add Formula # {chemical name} # {formula}"

* Add a chemical formula to an existing chemical name in the lab.
* If the chemical exists, set its formula and **print**:

"{chemical name} has been assigned the formula {formula}."

* Otherwise, **print**:

"The Chemical {chemical name} is not available in the lab."

### Input

* On the first line of the standard input, you will receive an integer **n**
* On the following **n** lines, the **chemicals** themselves will follow with their **quantity,** separated by a hashtag in the following format
* You will be receiving different **commands**, each on a new line, separated by " # ", until the "End" command is given

### Output

* Every command should **print** its own template sentence. At the **End**, **print** all chemicals with their updated quantities. If a chemical has a formula, include it in the output:

"Chemical: {chemical name}, Quantity: {quantity}, Formula: {formula}"

* If a chemical does not have a formula, **print**:

"Chemical: {chemical name}, Quantity: {quantity}"

### Constraints

* The **names** of the chemicals will **always** be **unique**.
* All given **commands** will be **valid**.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| [ '4',  'Water # 200',  'Salt # 100',  'Acid # 50',  'Base # 80',  'Mix # Water # Salt # 50',  'Replenish # Salt # 150',  'Add Formula # Acid # H2SO4',  'End'] | Water and Salt have been mixed. 50 units of each were used.  Salt quantity increased by 150 units!  Acid has been assigned the formula H2SO4.  Chemical: Water, Quantity: 150  Chemical: Salt, Quantity: 200  Chemical: Acid, Quantity: 50, Formula: H2SO4  Chemical: Base, Quantity: 80 |
| **Input** | **Output** |
| [ '3',  'Sodium # 300',  'Chlorine # 100',  'Hydrogen # 200',  'Mix # Sodium # Chlorine # 200',  'Replenish # Sodium # 250',  'Add Formula # Sulfuric Acid # H2SO4',  'Add Formula # Sodium # Na',  'Mix # Hydrogen # Chlorine # 50',  'End'] | Insufficient quantity of Sodium/Chlorine to mix.  Sodium quantity increased by 200 units, reaching maximum capacity of 500 units!  The Chemical Sulfuric Acid is not available in the lab.  Sodium has been assigned the formula Na.  Hydrogen and Chlorine have been mixed. 50 units of each were used.  Chemical: Sodium, Quantity: 500, Formula: Na  Chemical: Chlorine, Quantity: 50  Chemical: Hydrogen, Quantity: 150 |