01. Medieval Alchemy

In a mystical kingdom, an alchemist is on a quest to craft five legendary potions, each requiring specific magical ingredients and crystal energy. This journey is challenging, as substances and energy are limited and must be used precisely.

Potions to Craft

You will have to **memorize all crafted potion names**. The alchemist aims to craft **all** of the following potions:

Potion	Energy Level
Brew of Immortality	110
Essence of Resilience	100
Draught of Wisdom	90
Potion of Agility	80
Elixir of Strength	70

Input Data

- On the first line you will receive **quantities** of different **substances** the alchemist has stored, **separated by a comma and space** (**", "**).
- On the second line you will receive **levels** of **crystal energy**, also **separated by a comma and space** (**", "**). See the **Examples** section.

End Conditions

The alchemist's quest will **end immediately**, under the following circumstances:

- The alchemist has **successfully crafted all five potions**.
- If the alchemist **runs out of substances or crystals** before crafting all five potions.

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Alchemy Process

Once per day, the alchemist enters a secret room where he carefully stores his **substances** and **crystals**.

- To maintain their stability, he has stored the **substances in a special container**, **placing each one on top of the previous**. When he **needs a substance**, he **takes** the **last one** he stored.
- He uses **crystals as an** energy source and always **takes** the **first crystal**.

Crafting Logic

Each day, the alchemist combines **the last stored substance** with **the first crystal in line** to try to craft a new potion:

- The alchemist **will not attempt to craft the same potion if it has already been crafted**.
    - In this case, he tries to craft the next possible potion (follow the instructions below).
- If the **sum** of the **substance** and **crystal** energy **is equal to** one of the required **energy levels** from the **list** of **potions** and it has **not been crafted yet**, the **potion is successfully crafted and should be memorized**.
    - The **substance** is **consumed** and **disappears** from its respective collection.
    - The **crystal** is **exhausted** and **disappears** from its collection too.
- If the **sum does not exactly match any** of the required **energy levels** for the potions:
    - The alchemist **tries to use the energy** to **craft the potion** with the **highest possible energy requirements** which is **less than the combined energy**:
        - The **used substance** is **removed** from its collection.
        - The **crystal is returned** to the **back of the sequence** with a **reduced** (**decreased by 20** units) **energy level**.
        - Do **not return zero values** to the collection.
            - If the crystal's **energy drops** to **0 or less**, it is **removed entirely**.
    - If there is **no potion** with an **energy requirement** that **matches or** is **less than** the **combined energy**, the **attempt fails**.
        - The **substance is lost entirely** (remove it).
        - The **crystal is returned** to the **back of the sequence** with a **reduced** (**decreased by 5** units) **energy level**.
        - Do **not return zero values** to the collection.
            - If the crystal's **energy drops** to **0 or less**, it is **removed entirely**.

Input

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- On the **first line**, you will receive a **sequence of integers**, representing the **substances**, **separated** by **a comma and a single space** (**', '**).
- On the **second line**, you will receive a **sequence of integers**, representing all **crystals' energy levels**, **separated** by **a comma and a single space** (**', '**). See the **Examples** section.

Output

- On the first line, print the outcome based on **whether all five potions** were **crafted successfully**:
  - If **all** potions are **crafted**: **"Success! The alchemist has forged all potions!"**
  - If **not all** potions are **crafted**: **"The alchemist failed to complete his quest."**
- On the next line, print the **crafted potions** in the **order** they were prepared:

  "Crafted potions: {potion$_1$}, {potion$_2$} … {potion$_n$}"
  - If **no potions** were crafted, **skip** this line.
- Finally, print the **state** of **both sequences** on **separate lines**.
  - If a **sequence** is **empty**, **skip** its line.
  - **Substances** must be printed in stack order (from the last to the first element).

  "Substances: {substance$_n$}, {substance$_{n-1}$} … {substance$_1$}"

  "Crystals: {crystal$_1$}, {crystal$_2$} … {crystal$_n$}"

Constraints

- All given numbers will be **valid integers** in the range **[1 - 120]**
- **Both** sequences will **initially** have **at least one element**

Examples

Input	Output
40, 5, 80, 60, 75, 60, 65, 70 20, 35, 45, 25, 10, 30, 15	Success! The alchemist has forged all potions! Crafted potions: Draught of Wisdom, Essence of Resilience, Potion of Agility, Elixir of Strength, Brew of Immortality Substances: 5, 40 Crystals: 15, 25, 5, 5

Comment

We take the **last substance** with the **first crystal** and calculate the sum: **70** + **20** = **90** (combined energy). We iterate through all potions, **searching** for any potion with an **energy level equal to the combined energy**. We **skip** every potion

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that is **already crafted**. We find that "Draught of Wisdom" has energy level of **90**. We **keep** the **"Draught of Wisdom"** string in a separate collection. The **substance is removed** from the collection of substances. The crystal is **removed too**, [35, 45, 25, 10, 30, 15].

Next, the **last substance** in the row is now **65**, and the first crystal is **35**. The combined energy is **65** + **35** = **100**. **"Essence of Resilience"** requires exactly 100 units of energy, and it hasn't been crafted yet. It is now crafted successfully, and the **substance** and the **crystal** are **removed**.

The last **substance** is now **60**, and the first crystal is **45**. Calculated energy is **60** + **45** = **105**. No exact match for 105, the alchemist crafts the **next highest potion** requiring 80 energy (**"Potion of Agility"**). The **substance** is **removed**, and the **crystal** is **returned** to the back with **25 units of leftover energy** (45-20=25).

The **new state of crystals**: [**25**, 10, 30, 15, 25].

The last substance is **75**, and the first crystal is **25**. Combined energy: **75** + **25** = **100**. The potion **"Elixir of Strength"** (70 energy) is crafted. The **substance is removed** and the **crystal is returned** to the back with **5 units of leftover energy** (25-20=5).

The **new state of crystals**: [**10**, 30, 15, 25, 5].

The last substance is now **60**, and the first crystal is **10**. Combined energy: **60** + **10** = **70**. The potion **"Elixir of Strength"** requires exactly 70 energy but was already crafted. There is **no possible potion** to craft. The **substance is removed**, and the **crystal is returned** to the back with **5 units of leftover energy** (10-5=5).

Now **crystals** are: [**30**, 15, 25, 5, 5].

The last substance is now **80**, and the first crystal is **30**. Combined energy: **80** + **30** = **110**. The potion **"Brew of Immortality"** (110 energy) is crafted. The **substance** and the **crystal** are **removed**.

Final State: **Substances: [40, 5], Crystals: [15, 25, 5, 5]**.

We now have **all 5 potions** and **quit** the program. The correct messages are printed with the final states:

Crafted Potions: Draught of Wisdom, Essence of Resilience, Potion of Agility, Elixir of Strength, Brew of Immortality

Remaining Substances: [40, 5] (printed in stack order: 5, 40)

Remaining Crystals: [15, 25, 5, 5]

Input	Output
45, 65, 35, 25, 70 15, 30, 20, 10, 5, 40	The alchemist failed to complete his quest. Crafted potions: Potion of Agility, Elixir of Strength Crystals: 40, 25, 15

Input	Output
10, 15, 20 5, 10, 3	The alchemist failed to complete his quest. Crystals: 5

Input	Output
40, 60, 30, 20, 20, 10 5, 5	The alchemist failed to complete his quest. Substances: 20, 30, 60, 40

Input	Output
30, 40 2, 2	The alchemist failed to complete his quest.

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