# Programming Fundamentals with Python: Exam Preparation

## 01. The Imitation Game

**Submit your solutions in the SoftUni judge system at [https://judge.softuni.org/Contests/Practice/Index/2525#0](https://judge.softuni.org/Contests/Practice/Index/2525" \l "0).**

*During World War 2, you are a mathematician who joined the cryptography team to decipher the enemy's enigma code. Your job is to create a program to crack the codes.*

On the first line of the input, you will receive the **encrypted message**. After that, until the "Decode" command is given, **you will be receiving strings** with **instructions** for different **operations** that need to be performed upon the **concealed message** to **interpret** **it** and reveal its true content. There are several types of instructions, split by '|'

* "Move {number of letters}":
  + **Moves** the **first n letters** to the **back** of the string
* "Insert {index} {value}":
  + **Inserts** the given value **before the given index** in the string
* "ChangeAll {substring} {replacement}":
  + **Changes** **all occurrences** of the given substring with the replacement text

### Input / Constraints

* On the first line, you will receive a string with a message.
* On the following lines, you will be receiving commands, split by **'|' .**

### Output

* After the "Decode" command is received, print this message:  
  "**The decrypted message is: {message}**"

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| zzHe  ChangeAll|z|l  Insert|2|o  Move|3  Decode | The decrypted message is: Hello |
| **Comments** | |
| **ChangeAll|z|l**  zzHe → llHe (We replace all occurrences of 'z' with 'l')  **Insert|2|o**  llHe → lloHe (We add an 'o' before the character on index 2)  Move|3  lloHe → Hello (We take the first three characters and move them to the end of the string)  Finally, after receiving the **"Decode"** command, we print the resulting message. | |
| **Input** | **Output** |
| owyouh  Move|2  Move|3  Insert|3|are  Insert|9|?  Decode | The decrypted message is: howareyou? |

## 02. Fancy Barcodes

**Submit your solutions in the SoftUni judge system at [https://judge.softuni.org/Contests/Practice/Index/2303#1](https://judge.softuni.org/Contests/Practice/Index/2303" \l "1).**

Your first task is to determine if the given sequence of characters is a **valid** barcode or **not**.

**Each line must not contain anything else but a valid barcode**. A barcode is **valid** when:

* It is surrounded by a "@" followed by one or more "#"
* It is **at least 6 characters long** (without the surrounding "@" or "#")
* **It starts** with a **capital letter**
* It contains **only letters** (lower and upper case) **and digits**
* **It ends** with a **capital letter**

Examples of valid barcodes: @###Che46sE@##, @#FreshFisH@#, @###Brea0D@###, @##Che46sE@##

Examples of invalid barcodes: **##InvaliDiteM##**, **@InvalidIteM@**, **@#Invalid\_IteM@#**

Next, you have to determine the **product group** of the item from the **barcode**. The product group is obtained by **concatenating** **all the digits** found in the barcode. If there are **no digits** present in the barcode, the **default** product group is "00".

Examples:

@#FreshFisH@# -> product group: 00

@###Brea0D@### -> product group: 0

@##Che4s6E@## -> product group: 46

### Input

On the first line, you will be given an integer **n** – the count of barcodes that you will be receiving next.

On the following **n** lines, you will receive different strings.

### Output

For each barcode that you process, you need to print a message.

If the barcode is invalid:

* "Invalid barcode"

If the barcode is valid:

* "Product group: {product group}"

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 3  @#FreshFisH@#  @###Brea0D@###  @##Che4s6E@## | Product group: 00  Product group: 0  Product group: 46 |
| **Input** | **Output** |
| 6  @###Val1d1teM@###  @#ValidIteM@#  ##InvaliDiteM##  @InvalidIteM@  @#Invalid\_IteM@#  @#ValiditeM@# | Product group: 11  Product group: 00  Invalid barcode  Invalid barcode  Invalid barcode  Product group: 00 |

## 03. P!rates

**Submit your solutions in the SoftUni judge system at** [**https://judge.softuni.org/Contests/Practice/Index/2302#2**](https://judge.softuni.org/Contests/Practice/Index/2302#2)**.**

*Anno 1681. The Caribbean. The golden age of piracy. You are a well-known pirate captain by the name of Jack Daniels. Together with your comrades Jim (Beam) and Johnny (Walker), you have been roaming the seas, looking for gold and treasure… and the occasional killing, of course. Go ahead, target some wealthy settlements and show them the pirate's way!*

Until the "Sail" command is given, you will be receiving:

* You and your crew have targeted **cities**, with their **population** and **gold**, separated by "||".
* If you receive a city that has already been received, you have to increase the population and gold with the given values.

After the "Sail" command, you will start receiving lines of text representing events until the "End" command is given.

Events will be in the following format:

* "Plunder=>{town}=>{people}=>{gold}"
  + You have successfully attacked and plundered the town, killing the given number of people and stealing the respective amount of gold.
  + For every town you attack print this message: "{town} plundered! {gold} gold stolen, {people} citizens killed."
  + If any of those two values (population or gold) **reaches zero**, the town is disbanded.
    - You need to **remove it** from your collection of targeted cities and print the following message: **"{town} has been wiped off the map!"**
  + There will be no case of receiving more people or gold than there is in the city.
* "Prosper=>{town}=>{gold}"
  + There has been dramatic economic growth in the given city**, increasing its treasury** by the given amount of gold.
  + The gold amount **can be a negative number, so be careful.** If a negative amount of gold is given, print: "Gold added cannot be a negative number!" and ignore the command.
  + If the given gold is a valid amount, increase the town's gold reserves by the respective amount and print the following message:

"{gold added} gold added to the city treasury. {town} now has {total gold} gold."

### Input

* On the first lines, until the **"Sail"** command, you will be receiving strings representing the cities with their gold and population, separated by **"||"**
* On the following lines, until the **"End"** command, you will be receiving strings representing the actions described above, separated by **"=>"**

### Output

* After receiving the "End" command, if there are any existing settlements on your list of targets, you need to print all of them, in the following format:

"Ahoy, Captain! There are {count} wealthy settlements to go to:

{town1} -> Population: {people} citizens, Gold: {gold} kg

{town2} -> Population: {people} citizens, Gold: {gold} kg

…

{town…n} -> Population: {people} citizens, Gold: {gold} kg"

* If there are no settlements left to plunder, print:

"Ahoy, Captain! All targets have been plundered and destroyed!"

### Constraints

* The initial population and gold of the settlements will be valid 32-bit integers, never negative, or exceed the respective limits.
* The town names in the events will always be valid towns that should be on your list.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| Tortuga||345000||1250  Santo Domingo||240000||630  Havana||410000||1100  Sail  Plunder=>Tortuga=>75000=>380  Prosper=>Santo Domingo=>180  End | Tortuga plundered! 380 gold stolen, 75000 citizens killed.  180 gold added to the city treasury. Santo Domingo now has 810 gold.  Ahoy, Captain! There are 3 wealthy settlements to go to:  Tortuga -> Population: 270000 citizens, Gold: 870 kg  Santo Domingo -> Population: 240000 citizens, Gold: 810 kg  Havana -> Population: 410000 citizens, Gold: 1100 kg |
| **Input** | **Output** |
| Nassau||95000||1000  San Juan||930000||1250  Campeche||270000||690  Port Royal||320000||1000  Port Royal||100000||2000  Sail  Prosper=>Port Royal=>-200  Plunder=>Nassau=>94000=>750  Plunder=>Nassau=>1000=>150  Plunder=>Campeche=>150000=>690  End | Gold added cannot be a negative number!  Nassau plundered! 750 gold stolen, 94000 citizens killed.  Nassau plundered! 150 gold stolen, 1000 citizens killed.  Nassau has been wiped off the map!  Campeche plundered! 690 gold stolen, 150000 citizens killed.  Campeche has been wiped off the map!  Ahoy, Captain! There are 2 wealthy settlements to go to:  San Juan -> Population: 930000 citizens, Gold: 1250 kg  Port Royal -> Population: 420000 citizens, Gold: 3000 kg |