Problem: We will be provided with 4 integers. By using plus, minus, multiply and divide, we need to manipulate these 4 integers to obtain a final result – 24.

Firstly, we need to find out all possible permutations of these 4 integers. For 4 different integers, we will get possible answers. And we also need to consider about the arrangements of brackets. In this situation, we have only 5 possible ways to arrange the brackets:

And since we have 4 operations ), we will get in total possible results. Then we only need to check out whether the result equals to 24.

Input: 4 integers num1, num2, num3, num4

Output: A way to manipulate 4 integers to obtain 24

1. *numbers* ← {*num1*, *num2*, *num3*, *num4*}
2. *ops* ← {+, -, \*, /}
3. *perm*← {*numbers*}
4. **For** i ← 1 to 24 **Do**
5. *perm* ← Next\_permutation(*numbers*) ∪ *perm*

/\* Next\_permutation( ) is a function to get next permutation of *numbers* \*/

1. **End**
2. **For every** {*num1*, *num2*, *num3*, *num4*} ∈ *perm*

/\**perm* is a set of all possible permutations, for each permutation in this set…\*/

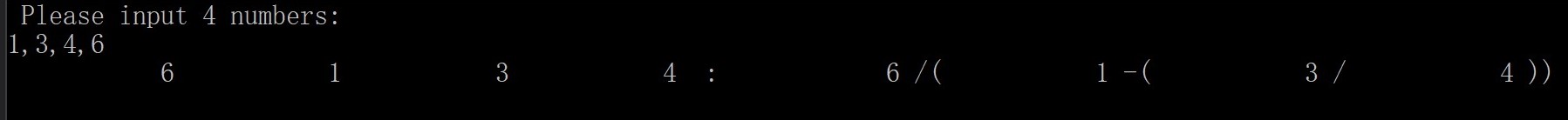
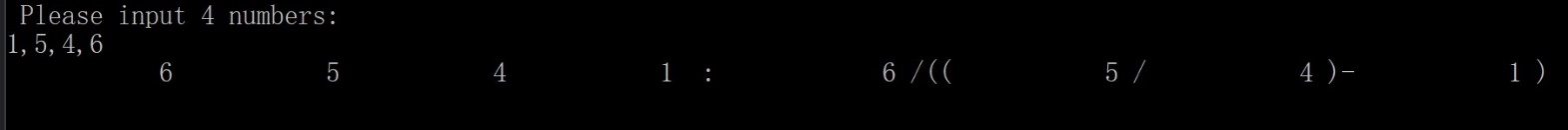
1. **For** **every** i ∈ *ops* **Do**
2. **For** **every** j ∈ *ops* **Do**
3. **For** **every** k ∈ *ops* **Do**

/\*i, j, k means a kind of operation – plus, minus, multiply or divide\*/

1. **If** (((*num1* i *num2*) j *num3*) k *num4*) == 24
2. **Then Return** (((*num1* i *num2*) j *num3*) k *num4*)
3. **Elseif** ((*num1* i (*num2* j *num3*)) k *num4*) == 24
4. **Then Return** ((*num1* i (*num2* j *num3*)) k *num4*)
5. **Elseif** (*num1* i ((*num2* j *num3*) k *num4*)) == 24
6. **Then Return** (*num1* i ((*num2* j *num3*) k *num4*))
7. **Elseif** (*num1* i (*num2* j (*num3* k *num4*))) == 24
8. **Then Return** (*num1* i (*num2* j (*num3* k *num4*)))
9. **Elseif** ((*num1* i *num2*) j (*num3* k *num4*)) == 24
10. **Then Return** ((*num1* i *num2*) j (*num3* k *num4*))

/\*5 possible ways to arrange the brackets\*/

1. **Else**
2. **Then** Print(‘No solution.’)
3. **End**
4. **End**
5. **End**
6. **End**
7. **End**



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| num1 | num2 | num3 | num4 | Result |
| 1 | 2 | 3 | 4 |  |
| 1 | 4 | 5 | 8 |  |
| 5 | 9 | 8 | 3 |  |
| 1 | 3 | 4 | 6 |  |
| 1 | 5 | 4 | 6 |  |