# INPUT-OUTPUT

Machine Input

- In INPUT OUTPUT type of problems, candidates are required to check out the pattern given in the arrangement of the question and then find out the desired output step, according to what the question asked.
- In order to solve these questions, the candidate has to think that there is some kind of machine or computer which gives output according to what it receives as the input. This machine works on a predetermined pattern and will give output at different steps.
- Always check the last step of the arrangement, you will get an idea that what logic has been used in the arrangement.
- Four types of questions are asked from this chapter.

Shifting

- All questions are based on interchanging the position of elements. If the given problem is not arrangement based, then check whether shifting is taking place. Just check the first two-three steps, if the words from a particular position are moving to another particular position and that is being repeated then the given problem is shifting.
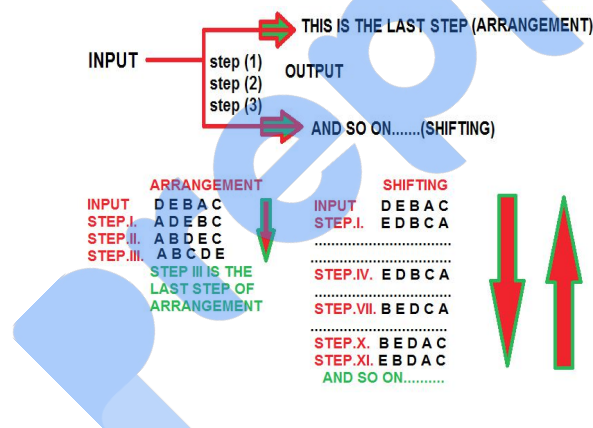
- In shifting, we can determine the previous steps and also the given input.
- But in arrangement we cannot be determined the previous steps.

Direction: A word and number arrangement machine when given an input line of words rearranges them following a particular rule in each step. The following is an illustration of the input and the steps of arrangement.

Input: sui me ato fe zen u no.
Step I: sui ato zen no me fe u
Step II: u fe me no zen ato sui
Step III: u me zen sui fe no ato
Step IV: ato no fe sui zon me u
Step V: ato fe zen u no sui me
and so on ....

As per the rule followed in the above steps, find the appropriate steps for input given in the given questions.

1. If the input is "Say not you are only wise yet" then which Step would read as "are Say only not wise you yet"?

   1) III
   2) XI
   3) IX
   4) VII
   5) None of these

   Correct Option: 3

   Explanation:

Input:	say	not	you	are	only	wise	Yet
	1	2	3	4	5	6	7
Step IX:	are	say	only	not	wise	you	Yet
	4	1	5	2	6	3	7

2. If step V is 'lo men chi from yet as know' then what will be the step VIII?

   1) from as lo chi yet know men
   2) from as lo chi yet men know
   3) men know yet chi lo as from
   4) men lo know as yet from chi
   5) None of these

   Correct Option: 5

   Explanation:

Step V:	lo	men	chi	from	yet	as	know
	3	4	5	6	7	1	2
Step VIII:	4	6	1	3	5	7	2
	men	from	as	lo	chi	yet	know

3. If step VI is "They have done their best to dig" then definitely what will be the input?

   1) have They to dig best done their
   2) have They to dig done their best
   3) have They dig to best done their
   4) have They dig to best their done
   5) None of these

   Correct Option: 4

Explanation:

Step VI:	They	have	done	their	best	to	Dig
	2	1	7	6	5	4	3
Input:	1	2	3	4	5	6	7
	have	They	dig	to	best	their	done

Trick to be used:

To solve the problems more easily, we can give numbers to each word.

Input	sui	me	ato	fe	zen	u	no
	1	**2**	**3**	**4**	**5**	**6**	**7**
Step I:	1	3	5	7	2	4	6
Step II:	6	4	2	7	5	3	1
Step III:	6	2	5	1	4	7	3
Step IV:	3	7	4	1	5	2	6
Step V:	3	4	5	6	7	1	2
Step VI:	2	1	7	6	5	4	3
Step VII:	2	7	5	3	1	6	4
Step VIII:	4	6	1	3	5	7	2
Step IX:	4	1	5	2	6	3	7
Step X:	7	3	6	2	5	1	4
Step XI:	7	6	5	4	3	2	1
Step XII:	1	2	3	4	5	6	7

Arrangement

- First of all, check that it is an arrangement. Then in case of the arrangement, words would be arranged in alphabetical order (may be in increasing or in decreasing form) and the number would be arranged in increasing or decreasing order. To check it, just look at the first three steps, if an arrangement is found then the problem is the arrangement-based problem.
- Sometimes some different logics are used:
    - Vowels (Maybe in increasing or decreasing order)
    - Consonant (Maybe in increasing or decreasing order)
    - Vowel…Consonant…Vowel…Consonant…
    - Consonant…Vowel…Consonant…Vowel…
    - Vowels (decreasing order)…(increasing order) Consonants.

Based on Numbers

- In this type of questions, the input has some numbers.
- Different steps are obtained by taking the numbers of the input and different arithmetic operations are performed after that.
- The arithmetic operation is possible if and only if the input has only the numbers. If the input has numbers and the chances of arrangement and shifting are not there, the problem is based on arithmetic operations for sure.
- Sometimes some different logics are used:
    - Even numbers (ascending order or descending order)
    - Odd numbers (ascending order or descending order)
    - Even…Odd…Even…Odd… (Ascending order or descending order)
    - Odd…Even…Odd…Even… (Ascending order or descending order)
    - Even (increasing/decreasing)… …(increasing/decreasing) Odd

Miscellaneous (Based on the new concept)

- This input can be anything and machine performs set of random operations on this.
- If none of the above types is applicable then you can be sure that the given problem is of miscellaneous type.

Some Important Tips

- First of all, observe the given input line of words and numbers and then the last step of rearrangement, so that candidate may get an idea about the changes in various steps of rearrangement.
- In order to know what changes have been made in each step, observe two consecutive steps carefully.
- Now, correlate the input, the last step and anyone of the middle steps. This will enable you to identify the rule of arrangement.

Key Factors

- It becomes very easy to solve this type of problems if you are able to understand the arrangements of the input.
- It is important to understand above arrangement to solve the question of machine input.
- Mostly it can be easily understood by last step/final output.
- If we go directly towards the final step of an input, we find that all numbers/ words are arranged systematically.

Some Rules to Keep in Mind

- Numbers - ascending, descending, etc.
- Words - Alphabetically, opposite alphabetically, alphabetically in vowels/consonants etc.
- In mixed form - if numbers and words both are given in arrangement mostly words are only related to next word and number to number.

Practice Questions:

1. **A machine generates pass codes step-by-step following certain rules as illustrated below.**

   Input anger near 53 72 61 69 height rest

   Step I 69 anger near 53 72 61 height rest

   Step II 69 near anger 53 72 61 height rest

   Step III 69 near 53 anger 72 61 height rest

   Step IV 69 near 53 height anger 72 61 rest

   Step V 69 near 53 height 72 anger 61 rest

   By following the above arrangement a new machine input will be given and you have to answer the question following that input.

   If the input is: 42 there 78 18 47 ok always go

   i. Which word or number comes after 'always' in the 6th step?

      A) 47

      B) 18

      C) Ok

      D) There

   Correct Option: A

   Explanation:

   The arrangement will be of six steps to bring the final step and the sequence will be as follows.
   Step I 18 42 there 78 47 ok always go
   Step II 18 always 42 there 78 47 ok go
   Step III 18 always 47 42 there 78 ok go
   Step IV 18 always 47 go 42 there 78 ok
   Step V 18 always 47 go 78 42 there ok
   Step VI 18 always 47 go 78 there 42 ok

   The answer is 47 as it comes after 'always' in the 6th step.

2. **Input 96 gain 36 forest 83 78 peek terrace**

   Step I peek 96 gain 36 forest 83 78 terrace

   Step II peek 83 96 gain 36 forest 78 terrace

   Step III peek 83 forest 96 gain 36 78 terrace

   Step IV peek 83 forest 36 gain 96 78 terrace

Step V peek 83 forest 36 gain 78 96 terrace

Step VI peek 83 forest 36 gain 78 terrace 96

If the input is: 99 87 adapt 46 58 boy ball get

i. Which word or number comes after '58' in the 4th step?

    A) 99

    B) 87

    C) ball

    D) get

Correct Option: A

Explanation:

The arrangement will be of seven steps to bring the final step and the sequence will be as follows.

Step I adapt 99 87 46 58 boy ball get

Step II adapt 46 99 87 58 boy ball get

Step III adapt 46 ball 99 87 58 boy get

Step IV adapt 46 ball 58 99 87 boy get

Step V adapt 46 ball 58 boy 99 87 get

Step VI adapt 46 ball 58 boy 87 99 get

Step VII adapt 46 ball 58 boy 87 get 99

The number 99 comes after '58' in the 4th step.

3. **Input buy pack 81 32 golf 59 then 56**

    Step I pack buy 81 32 golf 59 then 56

    Step II pack 59 buy 81 32 golf then 56

    Step III pack 59 golf buy 81 32 then 56

    Step IV pack 59 golf 56 buy 81 32 then

    Step V pack 59 golf 56 buy 32 81 then

    Step VI pack 59 golf 56 buy 32 then 81

    If the input is: year 39 give 47 house full 94 55

i. Which is the sixth word or number from right in the second step?

    A) 39

    B) 55

    C) year

D) house

Correct Option: C

Explanation:

The arrangement will be of six steps to bring the final step and the sequence will be as follows.

Step I full year 39 give 47 house 94 55

Step II full 94 year 39 give 47 house 55

Step III full 94 house year 39 give 47 55

Step IV full 94 house 55 year 39 give 47

Step V full 94 house 55 give year 39 47

Step VI full 94 house 55 give 47 year 39

The word year is at the sixth position from right in the second step.

4. **Output found never 37 58 ok 96 no 23**

   Step I 23 found never 37 58 ok 96 no

   Step II 23 ok found never 37 58 96 no

   Step III 23 ok 96 found never 37 58 no

   Step IV 23 ok 96 never found 37 58 no

   Step V 23 ok 96 never 37 found 58 no

   Step VI 23 ok 96 never 37 no found 58

   Step VII 23 ok 96 never 37 no 58 found

   If the output is: later out time for 63 84 41 95

i. How many steps are required to bring the last step of the output?

   A) 5

   B) 6

   C) 7

   D) 4

Correct Option: B

Explanation:

The arrangement will be of six steps to bring the final step and the sequence will be as follows.

Step I 41 later out time for 63 84 95

Step II 41 for later out time 63 84 95

Step III 41 for 63 later out time 84 9

Step IV 41 for 63 out later time 84 95

Step V 41 for 63 out 84 later time 95

Step VI 41 for 63 out 84 later 95 time

5. **Input night cast 25 31 then from 94 65**

   Step I 31 night cast 25 then from 94 65

   Step II 31 then night cast 25 from 94 65

   Step III 31 then 25 nights cast from 94 65

   Step IV 31 then 25 from nights cast 94 65

   Step V 31 then 25 from 94 night cast 65

   Step VI 31 then 25 from 94 night 65 cast

   If the input is: 37 yellow 61 42 53 violet green red

i. Which word or number comes after '61' in the 3rd step?

   A) 61

   B) Yellow

   C) Green

   D) red

Correct Option: C

Explanation:

The arrangement will be of four steps to bring the final step and the sequence will be as follows.

Step I 37 yellow 42 61 53 violet green red

Step II 37 yellow 42 violet 61 53 green red

Step III 37 yellow 42 violet 53 61 green red

Step IV 37 yellow 42 violet 53 red 61 green

The word green comes after '61' in the 3rd step.