SEQUENTIAL OUTPUT TRACING

- Introduction
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INTRODUCTION

In this section we are going have a short discussion on Reasoning's most frequent and cheeky topic – **Machine Input-Output!**

The thing about this topic is – it is easy. That is it! It is EASY.

What is difficult is that – we are LAZY!

Wait up! Here is an argument ready!

Betting on Cricket scores – movie box office predictions – share market ups and downs – Bank exam cut-off predictions – are all predicted based on a certain 'pattern' – and the 'pattern' that we take into consideration to base our prediction pertains to more than 2 samples.

Example – last 5 match's average scores in India vs. Pak.

We notice, Virat Kohli is averaging better … then maybe Rohit Sharma …

On the basis of the avg. of those – we predict that in today's match, Virat will top score, followed by Rohit, Dhawan, Kumar, Dhoni … etc…etc…

What did we do? We identified a pattern – then based on that pattern arranged a new set of elements.

If this we can do – we can do machine input/output sum too – only thing required is interest and determination to solve some 50-100 sums and get the hang of it once and for all!

Then you will not require revising this chapter again and again. Just once in your life – do this

chapter, solve as many sums as possible and then don't them at all except for in exams! And that too – successfully!

KEY POINTS

MACHINE INPUT/OUTPUT

1. First off - don't look at an I/O question and skip it! It may be an easy one.

2. Look at the Input – see what you are up against. Only words/alphabets or only numbers or alpha-numeric combination.

3. Then ignore every step and go straight to the last step – now concentrate how they've finally arranged the input.

4. Usually the kind of arrangements we'd find are:

   a. If only numbers – then in ascending or descending.

   b. Words – 'A-Z or Z-A' and as per dictionary! (Pop – pope – popped!)

   c. Alpha-numeric – is jumbled in that case you may have all the numbers together in the beginning or at the end, in ascending or descending; the words in the beginning or at the end, in A-Z or Z-A; OR, you may have a number and a word in alternating pattern, where - the numbers will ascend or descend – and the words will have their own A-Z/Z-A pattern!

5. Whatever the pattern is – look at the last step and form an idea in your mind – 'okay, so numbers first and then the alphabets all in descending/Z-A – fine! Got it!'

6. Then look at the first step – and identify – how they have started out with the arrangement.
   Are they taking a number first? If so highest or lowest number?
   Is the number introduced in the step from the front of the sequence or from the last?
   Same thing will apply to words too.

7. You will usually require taking note of 3-4 steps to fully identify the pattern and then you can begin with your own solving. (Don't waste time copying the steps of the question from the screen! Does anyone do that?)

8. Note! When you have words arrangement – don't waste time writing the entire words in your rough sheet – use only the first alphabets, and where there is more than one same first letter, then use the word's second/third letter to differentiate.

   Example:

Input : Risk Crab Apple Zombie Home Sailor Rikshaw
Step 1: Risk Crab Apple Home Sailor Rickshaw Zombie
Step 2: Risk Crab Apple Home Rickshaw Sailor Zombie

   and so on …

Step1	Ris	C	A	H	S	Ric	Z
Step2	Ris	C	A	H	Ric	S	Z

9. For question where they give a separate set of Input for every sub-question and asks you to identify if it is 'Step III'? – Or, asks you to give the number of steps required to solve a particular input sequence – my sincerest and honest advice is – quickly solve it!

   There will be 100% chance of you being correct!

   But if you do a mental calculation of the number of inputs arranged in step III and accordingly give your answer – I leave up to you to decide the chances of you getting 'em wrong!

   So – please avoid guesswork!

10. All the above things that I talked about are applicable if you are able to identify the sequencing/pattern within max 60 seconds – if it is taking more time – go ahead to solve other sums.

But mark it for review so that if time permits
you can come back to give 'em another try!

HOW TO SOLVE INPUT OUTPUT QUESTIONS

In all the competitive exams we can accept input output questions in logical reasoning section From the Input- Output section good number of questions have been asked in previous exams like IBPS, RRB, RBI exams. We can accept nearly 5 questions based on input output series method. So understanding the concept of input output series method is very important

In this input output method we are supposed to imagine that input is fed to machine. Machine process the input and arrange the input in each step and produce the final output in the final step We have to determine the pattern and based on that solve the questions. A word and number arrangement machine when given an input line of words and numbers rearranges them following a particular rule in each step to produce final output

In this machine arrangement can be of following types:

1. Numeric numbers arranging in decreasing order in each step
2. Words arranging in alphabetic order from A-Z
3. In series there is both numeric and alphabetic words, so in one step number is arrange in decreasing order and in other step word is arrange in alphabetic order from A-Z.
4. Number can be arrange by odd and even numbers. Odd numbers are arrange in decreasing order than even number in decreasing order.
5. Words are arrange in alphabetic order in extreme left and numbers are arrange in decreasing order at extreme right in each step
6. First words are arrange in alphabetic order than numbers are arrange in decreasing order.

There are a few examples and types given below which help you to better understand the input output questions.

EXAMPLE PROBLEM

To all the aspirants of competitive exams, Input Output topic seems to be quite familiar. Generally 5-7 questions from this topic do appear in every bank exam whether it be SBI, RBI, IBPS etc.

This is one of the easiest topic of reasoning because what matters here is speed because accuracy flows in with practice.
Most of us get stuck with these questions and waste our precious time because it lures them being easy but lengthy to solve once not practiced.

Let's get into the race and start thinking like examiners as what mistakes they are expecting from us. So we'll expertise in this topic today and will make sure that this easiness doesn't harm our time in the exams.

RULE

There are certain patterns followed in these type of questions. We need to study the pattern and then follow the same pattern in the question asked.

TYPES:

Type-1:

When the pattern consists of only numbers:

Example 1:

An electronic device rearranges numbers step by step in a particular order according to set rules. The device stops when the final result ie step 4 is obtained. Study the arrangement and answer the following question.

Input	55	89	23	67	87	90
Step 1	90	55	89	23	67	87
Step 2	90	89	55	23	67	87
Step 3	90	89	87	55	23	67
Step 4	90	89	87	67	55	23

Question: What is the fourth element to the left of last element in step 3 of the following input?

INPUT: 43 61 13 76 23 82

OPTIONS:

a) 61
b) 76
c) 23
d) 82
e) none of the above

Solution:

Now following the same pattern given above, we would obtain the final output for this given input as follows:

Step 1 82 43 61 13 76 23
Step 2 82 76 43 61 13 23
Step 3 82 76 61 43 13 23
Step 4 82 76 61 43 23 13--- FINAL OUTPUT

ANSWER: b

Type 2:

When the pattern consists of only words:

Example 2:

Input have an ace up your sleeve

Step 1 ace have an up your sleeve
Step 2 ace an have up your sleeve
Step 3 ace an have sleeve up your

Question: What will be the step 2 of the following input?

INPUT: laugh all the way to bank

OPTIONS:

a) all bank to the way laugh
b) all bank laugh way the to

c) all bank laugh the way to
d) all bank laugh to the way
e) none of the above

Solution:

Now following the same pattern given above, we would obtain the final output for this given input as follows:

Step 1 all laugh the way to bank
Step 2 all bank laugh the way to
Step 3 all bank laugh the to way

ANSWER: c

Type 3:

When the pattern consists of both the numbers and words

Example 3:

INPUT:
34 best 86 19 of 56 your 78 ability

Step 1 19 34 best 86 of 56 78 ability
Step 2 19 34 56 best 86 78 ability of
Step 3 19 34 56 78 86 ability best of

Question: How many steps are required to get the final output?

INPUT:
beyond 87 the 93 12 call 22 of duty

OPTIONS:

a) 2
b) 3
c) 4
d) more than four
e) none of the above

Solution:

Now following the same pattern given above, we would obtain the final output for this given input as follows:

Step 1 '12 beyond 87 93 call 22 of duty the
Step 2 '12 22 beyond 87 93 call duty of the
Step 3 '12 22 87 93 beyond call duty of the

ANSWER: b

So this concludes the types and some examples on the topic: Input-Output. Hope your basics would be clear by now.
Now what is required by you is a lot of practice so that you could come up with both accuracy + speed.
There are some practice problems given below.

PRACTICE PROBLEMS (EXPLANATORY ANSWERS AT THE END)

1. An Input /Output device arranges numbers step-by-step in a particular order according to a set of rules. The device stops arranging the numbers when the final result is obtained. –

Input- 94 65 35 100 54 69
Step 1 100 94 65 35 54 69
Step 2 100 94 69 65 35 54
Step 3 100 94 69 65 54 35

As per the rules followed in the above steps, find out in each of the following question the appropriate steps for the input given below :
Study the above arrangement carefully and give the answer to the following question,

What is the last step of the input given below?
8 70 90 17 35 40

2. A word and number arrangement machine when given an input line of words and numbers rearranges them following a particular rule. Following is the illustration of input and rearrangement.

As per the rule followed in the above steps find out in each of following questions the appropriate steps for the input given below

INPUT: hand sand major your watch action

How many steps would be needed to complete the arrangement?

3. A word and number arrangement machine when given an input line of words and numbers rearranges them following a particular rule in each step. The following is an illustration of input and rearrangement.

INPUT: gone name 43 39 18 for again 66

Step 1 : 66 gone name 43 39 18 for again
Step 2 : 66 again gone name 43 39 18 for
Step 3 : 66 again 43 gone name 39 18 for
Step 4 : 66 again 43 for gone name 39 18
Step 5 : 66 again 43 for 39 gone name 18
Step 6 : 66 again 43 for 39 gone name 18
Step 7 : 66 again 43 for 39 gone 18 name

As per the rule followed in the above steps find out in each of following questions the appropriate steps for the input given below:

INPUT:
their 19 27 dent are 91 hour zero 31 16 chairs.

Q1: Which of the following will be step 4?

OPTIONS:

A) 91 are 31 their 19 27 dent hour zero 16 chairs

B) 91 their 19 27 dent are hour zero 31 16 chairs

C) 91 are 31 chairs their 19 27 dent hour zero 16

D) 91 are 31 chairs 27 dent 19 their hour zero 16

Q2: Which of the following would be final arrangement?

OPTIONS:

A) 91 are their 27 19 dent hour zero 31 16 chairs

B) 91 are 31 chairs 27 dent 19 hour 16 their zero

C) 91 are 31 chairs 27 19 dent hour 16 their zero

D) 91 are 31 chairs 27 dent 19 zero hour 16 their

Q3: Which of the following would be the Step 1?

A) 91 their 19 are 27 dent hour zero 31 16 chairs

B) 91 are 31 chairs 27 dent 19 hour 16 their zero

C) 91 are 31 chairs 27 19 dent hour 16 their zero

D) 91 chairs are 31 27 dent 19 zero hour 16 their

E) None of these

4. A word and number arrangement machine when given an input line of words and numbers rearranges them following a particular rule in each step. The following is an illustration of input and rearrangement

INPUT:
sap 28 have 18 99 48 luck nice 78 ramp

Step1 have sap 28 18 48 luck nice 78 ramp 99
Step2 luck have sap 28 18 48 nice ramp 99 78
Step3 nice luck have sap 28 18 ramp 99 78 48
Step4 ramp nice luck have sap 18 99 78 48 28
Step5 sap ramp nice luck have 99 78 48 28 18

As per the rule followed in the above steps find out in each of following questions the appropriate steps for the input given below

INPUT:
49 late zen 15 82 yet can vast 33 alt 87 54

Q1: How many steps would be needed to complete the arrangement?

OPTIONS:

A) IV
B) V
C) VI
D) VII
E) None of these

Q2: Which step number would be the following output?

OUTPUT:
Vast late can alt zen 15 yet 33 87 82 54 49

OPTIONS:

A) III
B) II
C) VII
D) IV
E) None of these

SOLUTION WITH EXPLNATORY ANSWER

1. Based on the above series find the last step of the given arrangement. You will easily find out that the numbers are arranged in descending order. In the step 1 higher number i.e. 100 is arranged come first, only one element in each step is arranged .Than in step 2, 94 is already arranged so 69 which is third highest number comes and so on.
Following these steps we have to find steps required to complete the above arrangement.

Input	*8*	*70*	*90*	*17*	*35*	*40*
Step1	90	8	70	17	35	40
Step2	90	70	8	17	35	40
Step3	90	70	40	8	17	35
Step4	90	70	40	35	8	17
Step5	90	70	40	35	17	8

Answer:
So 5 steps are required to complete the given arrangement and from above we can tell last step i.e. **90 70 40 35 17 8**

2. From the above input output series we have to carefully see the pattern how the words are arranging in each step .Based on that we have arrange the words in each step and get final output .As in above pattern words are arranging in alphabet order A-Z in each step. So we can get final output based on that.

Input:	**hand**	**sand**	**major**	**your**	**watch**	**action**
Step1	action	hand	sand	major	your	watch
Step2	action	hand	major	sand	your	watch
Step3	action	hand	major	sand	watch	your

Answer:
As in step-2 hand is already arrange in alphabet order so we arrange the next word in alphabet order in same step
So THREE steps are required to complete the given arrangement

3. Solutions:

Q1:

From the above arrangement pattern we find that it consist of two series the numeric number series and alphabet series. The numeric numbers are arranged in decreasing order and alphabet are arranged with first alphabet of every word from A-Z alphabet which appear first to lower down in series and in one step number is arranged and in other step a word is arranged.

INPUT:
their 19 27 dent are 91 hour zero 31 16 chairs

Step1 91 their 19 27 dent are hour zero 31 16 chairs
Step2 91 are their 19 27 dent hour zero 31 16 chairs
Step3 91 are 31 their 19 27 dent hour zero16 chairs
Step4 91 are 31 chairs their 19 27 dent hour zero 16
Step5 91 are 31 chairs 27 their 19 dent hour zero 16
Step6 91 are 31 chairs 27 dent their 19 hour zero 16
Step7 91 are 31 chairs 27 dent 19 their hour zero 16
Step8 91 are 31 chairs 27 dent 19 hour their zero 16
Step9 91 are 31 chairs 27 dent 19 hour 16 their zero

So from above arrangement we can tell what the possible arrangement in step 4
Answer: C

Q2:

Answer: B, We can easily find out the step four from the above.

Q3:

Answer: E, None of these. As none of given options matches with Step 1

4. Solutions

Q1:

From careful analysis of the given input , various steps of rearrangement in step 1 word which will appear first in dictionary is placed at extreme left

position and highest number is placed in extreme right position . In step 2 word which appear second place in dictionary is placed at extreme left and second highest number is placed at extreme right. Same is followed in all next steps

INPUT:
49 late zen 15 82 yet can vast 33 alt 87 54

Step 1 alt 49 late zen 15 82 yet can vast 33 54 87
Step2 can alt 49 late zen 15 yet vast 33 54 87 82
Step3 late can alt 49 zen 15 yet vast 33 87 82 54
Step4 vast late can alt zen 15 yet 33 87 82 54 49
Step5 yet vast late can alt zen 15 87 82 54 49 33
Step6 zen yet vast late can alt 87 82 54 49 33 15

Answer: C) VI

Q2:

From the above series we can find out which is the step

Answer: D) IV