

IITD&M Kancheepuram

Problem solving and programming

Date: 4 March 2021

Duration: 01 Hr.

Total Marks: 30

Section A:

Answer these two programs. Each program carries 10 marks (10* 2= 20 Marks)

1. A company wishes to bucketize their item IDs for better search operations. The bucket for the item ID is chosen on the basis of the maximum value of the digit in the item ID. Write an algorithm to find the bucket to which the item ID will be assigned.

Input

The input consists of an integer item1D, representing the identity number of the item.

Output

Print an integer representing the bucket to which the item ID will be assigned.

Example

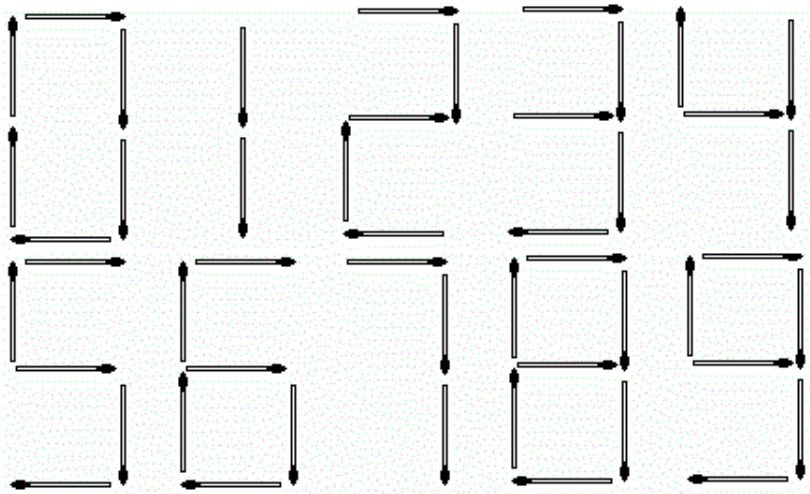
Input:

32387634

Output:

8

2. Consider the representation of digits using match sticks as given below.



You are given an integer N. Your task is to find the total count of match sticks required to represent the given number using match sticks. For example, if N = 123, you should output 12.

Write a C program for the same.

Input format:

The first line of the input contains an integer N.

Output: Print an integer, i.e., the number of matches needed.

Section B:

Answer all the questions. Each question carries 2 Marks (5 *2 = 10 Marks)

1. Find the output of the below code. Justify your answer with proper explanation

```
1  #include <stdio.h>
2  #include<string.h>
3  int main() {
4      char p[] = "IIITDM";
5      char t;
6      int i, j;
7      for(i=0,j=strlen(p); i<j; i++)
8      {
9          t = p[i];
10         p[i] = p[j-i];
11         p[j-i] = t;
12     }
13     printf("%s", p);
14     return 0;
15 }
```

2. Find the output of the below code. Justify your answer with proper explanation

```
1  #include <stdio.h>
2  #define PRODUCT(x) (x*x*x*x)
3
4  int main() {
5      int x = 2;
6      int result = PRODUCT(x);
7      printf("%d %d", x, result);
8      return 0;
9  }
```

3. Explain the need for dynamic memory allocation and write about the functions required in dynamic memory allocation with syntax.

4. What is the output of the following program. Justify your answer.

```
#include<stdio.h>
int main()
{
    int a=5,b=10,c=15;
    int*arr[]={&a,&b,&c};
    printf("%d", arr[1]);
    return 0;
}
```

5. Consider the following code snippet. How many times is printf executed in the program below? Justify your answer.

```
1  #include <stdio.h>
2  int main() {
3      int i = 64;
4      for (; i; i >>= 1)
5          printf("IIITDM");
6      return 0;
7  }
```