Problem A2.1 Generating all Prime Numbers Between 1 and N

A prime number is a positive integer that is divisible only by itself and the integer 1. It is not exactly divisible by any other integer between 2 and N-1. You are required to write a complete C program that takes as input a positive integer N and displays all the prime numbers up to N.

In performing this task, you may want to consider writing and using a function that takes as input an integer, checks if this integer is a prime number or not, and returns a BOOLEAN value indicating whether it is a prime number or not.

Notional Time for Solving Problem: 30 minutes.

Problem A2.2 Generating all Numbers Between 1 and N that are Prime & Palindrome

A prime number can also be a palindrome at the same time. A integer that is a palindrome is one in which the digits of the integer reads the same from left to right or right to left. Indeed, a palindrome is one in which the original number and the number in which its digits are reversed are the same.

You are required to write a complete C program that takes as input a positive integer N and display all the numbers up to N that are prime as well as palindrome.

Note that while solving Problem A2.1, you have written and used a function that takes as input an integer, checks if this integer is a prime number or not, and returns a BOOLEAN value indicating whether it is a prime number or not. In a similar manner, you may want to consider writing and using a function that checks if an integer is a palindrome or not. This would make your program elegant.

Notional Time for Solving Problem: 30 minutes.

Problem A2.3 Generating all Numbers Between 1 and N that have Distinct Digits

An integer like 1479 is one in which the individual digits of the integer are distinct. In the integer 15272, the individual digits of the integer are not all distinct. This is because, in 15272, the digit 2 occurs twice.

You are required to write a complete C program that takes as input a positive integer N and display all the numbers up to N have only distinct digits.

Notional Time for Solving Problem: 30 minutes.

Problem A2.4 Generating all Numbers Between 1 and N that have Distinct Digits in Ascending Order

An integer like 13579 is one in which there are only distinct individual digits. But these digits are also in ascending order when read from main significant digit (the left most digit) to the least significant digit (the right most digit).

You are required to write a complete C program that takes as input a positive integer N and display all the numbers up to N have only distinct digits and the individual digits are in ascending order when read from main significant digit (the left most digit) to the least significant digit (the right most digit).

Notional Time for Solving Problem: 30 minutes.

Problem A2.5 Generating all Numbers Between 1 and N that have Distinct Digits in Descending Order

An integer like 7531 is one in which there are only distinct individual digits. But these digits are also in descending order when read from main significant digit (the left most digit) to the least significant digit (the right most digit).

You are required to write a complete C program that takes as input a positive integer N and display all the numbers up to N have only distinct digits and the individual digits are in descending order when read from main significant digit (the left most digit) to the least significant digit (the right most digit).

Notional Time for Solving Problem: 30 minutes.

Problem A2.6 Generating all Numbers Between 1 and N that have Digits *(not necessarily distinct)* in Ascending Order

An integer like 13357 is one in which there are non-distinct individual digits. But these digits are also in ascending order when read from main significant digit (the left most digit) to the least significant digit (the right most digit).

You are required to write a complete C program that takes as input a positive integer N and display all the numbers up to N have not necessarily distinct digits and the individual digits are in ascending order when read from main significant digit (the left most digit) to the least significant digit (the right most digit).

Notional Time for Solving Problem: 30 minutes.

Problem A2.7 Generating all Numbers Between 1 and N that have Digits *(not necessarily distinct)* in Descending Order

An integer like 5331 is one in which there are not necessarily distinct individual digits. But these digits are also in descending order when read from main significant digit (the left most digit) to the least significant digit (the right most digit).

You are required to write a complete C program that takes as input a positive integer N and display all the numbers up to N have not necessarily distinct digits and the individual digits are in descending order when read from main significant digit (the left most digit) to the least significant digit (the right most digit).

Notional Time for Solving Problem: 30 minutes.

Problem A2.8 Generating all Numbers Between 1 and N that have Only Odd Digits

An integer like 5731 is one in which there are only odd digits.

You are required to write a complete C program that takes as input a positive integer N and display all the numbers up to N have only odd digits. You may consider that such a number may not contain the digit zero.

Notional Time for Solving Problem: 15 minutes.

Problem A2.9 Generating all Numbers Between 1 and N that have Only Even Digits

An integer like 2446 is one in which there are only even digits.

You are required to write a complete C program that takes as input a positive integer N and display all the numbers up to N have only even digits. You may consider that such a number may not contain the digit zero.

Notional Time for Solving Problem: 15 minutes.

Problem A2.10 Generating all Numbers Between 1 and N that Odd Digits in Ascending Order and Even Digits in Descending Order □ □

An integer like 13896 is one in which the odd digits 1, 3 and 9 are in ascending order when read from main significant digit (the left most digit) to the least significant digit (the right most digit). The even digits in 13896, namely, 8 and 6 are in descending order when read from main significant digit (the left most digit) to the least significant digit (the right most digit). The digits need not be necessarily distinct digits, whether odd or even.

You are required to write a complete C program that takes as input a positive integer N and display all the numbers up to N that have odd digits in ascending order when read from main significant digit (the left most digit) to the least significant digit (the right most digit) and even digits in descending order when read from main significant digit (the left most digit) to the least significant digit (the right most digit).

Notional Time for Solving Problem: 45 minutes.