TEST CASES

Test-1

```
THIS PROGRAM WILL EXECUTE 6 TIMES
EXECUTE=0
Enter the  number=3

Enter the  number=5

Enter the  number=7

Enter the  number=2

Enter the  number=12

Enter the  number=22

Enter the  number=21

Enter the  number=56

Enter the  number=34

Enter the  number=21
Entered numbers=3,5,7,2,12,22,21,56,34,21,
```

->

```
Entered numbers=3,5,7,2,12,22,21,56,34,21,

{3,5,7,12,22,56,}Array length=6
{3,7,12,22,56,}Array length=5
{3,12,22,56,}Array length=4
{3,12,22,56,}Array length=4
{3,22,56,}Array length=3
{3,21,56,}Array length=3
{3,56,}Array length=2
{3,34,}Array length=2
{3,21,}Array length=2
{3,}Array length=1
{5,7,12,22,56,}Array length=5
{5,12,22,56,}Array length=4
{5,12,22,56,}Array length=4
{5,22,56,}Array length=3
{5,21,56,}Array length=3
{5,56,}Array length=2
{5,34,}Array length=2
{5,21,}Array length=2
{5,}Array length=1
{7,12,22,56,}Array length=4
{7,12,22,56,}Array length=4
{7,22,56,}Array length=3
{7,21,56,}Array length=3
{7,56,}Array length=2
{7,34,}Array length=2
{7,21,}Array length=2
{7,}Array length=1
{2,12,22,56,}Array length=4
{2,22,56,}Array length=3
{2,21,56,}Array length=3
{2,56,}Array length=2
{2,34,}Array length=2
{2,21,}Array length=2
{2,}Array length=1
{12,22,56,}Array length=3
{12,21,56,}Array length=3
{12,56,}Array length=2
```

->

```
{2,12,22,56,}Array length=4
{2,22,56,}Array length=3
{2,21,56,}Array length=3
{2,56,}Array length=2
{2,34,}Array length=2
{2,21,}Array length=2
{2,}Array length=1
{12,22,56,}Array length=3
{12,21,56,}Array length=3
{12,56,}Array length=2
{12,34,}Array length=2
{12,21,}Array length=2
{12,}Array length=1
{22,56,}Array length=2
{22,56,}Array length=2
{22,34,}Array length=2
{22,}Array length=1
{22,}Array length=1
{21,56,}Array length=2
{21,34,}Array length=2
{21,}Array length=1
{21,}Array length=1
{56,}Array length=1
{56,}Array length=1
{56,}Array length=1
{34,}Array length=1
{34,}Array length=1
{21,}Array length=1
longest array size=6
{3,5,7,12,22,56,}
```

Test-2

```
EXECUTE=1
Enter the  number=3

Enter the  number=22

Enter the  number=12

Enter the  number=21

Enter the  number=11

Enter the  number=3

Enter the  number=4

Enter the  number=5

Enter the  number=6

Enter the  number=7
Entered numbers=3,22,12,21,11,3,4,5,6,7,
```

->

```
{3,22,}Array length=2
{3,12,21,}Array length=3
{3,21,}Array length=2
{3,11,}Array length=2
{3,4,5,6,7,}Array length=5
{3,4,5,6,7,}Array length=5
{3,5,6,7,}Array length=4
{3,6,7,}Array length=3
{3,7,}Array length=2
{3,}Array length=1
{22,}Array length=1
{22,}Array length=1
{22,}Array length=1
{22,}Array length=1
{22,}Array length=1
{22,}Array length=1
{22,}Array length=1
{22,}Array length=1
{22,}Array length=1
{12,21,}Array length=2
{12,}Array length=1
```

->

```
{3,4,5,6,7,}Array length=5
{3,5,6,7,}Array length=4
{3,6,7,}Array length=3
{3,7,}Array length=2
{3,}Array length=1
{4,5,6,7,}Array length=4
{4,6,7,}Array length=3
{4,7,}Array length=2
{4,}Array length=1
{5,6,7,}Array length=3
{5,7,}Array length=2
{5,}Array length=1
{6,7,}Array length=2
{6,}Array length=1
{7,}Array length=1
longest array size=5
{3,4,5,6,7,}
```

Test-3

```
EXECUTE=2
Enter the  number=21

Enter the  number=23

Enter the  number=12

Enter the  number=0

Enter the  number=6

Enter the  number=5

Enter the  number=4

Enter the  number=55

Enter the  number=66

Enter the  number=12
Entered numbers=21,23,12,0,6,5,4,55,66,12,
```

->

```
{21,23,55,66,}Array length=4
{21,55,66,}Array length=3
{21,55,66,}Array length=3
{21,55,66,}Array length=3
{21,55,66,}Array length=3
{21,55,66,}Array length=3
{21,66,}Array length=2
{21,}Array length=1
{21,}Array length=1
{23,55,66,}Array length=3
{23,55,66,}Array length=3
{23,55,66,}Array length=3
{23,55,66,}Array length=3
{23,55,66,}Array length=3
{23,55,66,}Array length=3
{23,66,}Array length=2
{23,}Array length=1
{23,}Array length=1
{12,55,66,}Array length=3
{12,55,66,}Array length=3
{12,55,66,}Array length=3
{12,55,66,}Array length=3
{12,55,66,}Array length=3
{12,66,}Array length=2
{12,}Array length=1
{12,}Array length=1
{0,6,55,66,}Array length=4
{0,5,55,66,}Array length=4
{0,4,55,66,}Array length=4
{0,55,66,}Array length=3
{0,66,}Array length=2
{0,12,}Array length=2
{0,}Array length=1
{6,55,66,}Array length=3
{6,55,66,}Array length=3
{6,55,66,}Array length=3
{6,66,}Array length=2
{6,12,}Array length=2
```

->

```
{4,55,66,}Array length=3
{4,66,}Array length=2
{4,12,}Array length=2
{4,}Array length=1
{55,66,}Array length=2
{55,}Array length=1
{55,}Array length=1
{66,}Array length=1
{66,}Array length=1
{12,}Array length=1
longest array size=4
{21,23,55,66,}
```

Test-4

```
EXECUTE=3
Enter the  number=12

Enter the  number=33

Enter the  number=21

Enter the  number=0

Enter the  number=0

Enter the  number=2

Enter the  number=1

Enter the  number=45

Enter the  number=36

Enter the  number=5
Entered numbers=12,33,21,0,0,2,1,45,36,5,
```

->

```
{12,33,45,}Array length=3
{12,21,45,}Array length=3
{12,45,}Array length=2
{12,45,}Array length=2
{12,45,}Array length=2
{12,45,}Array length=2
{12,45,}Array length=2
{12,36,}Array length=2
{12,}Array length=1
{12,}Array length=1
{33,45,}Array length=2
{33,45,}Array length=2
{33,45,}Array length=2
{33,45,}Array length=2
{33,45,}Array length=2
{33,45,}Array length=2
{33,36,}Array length=2
{33,}Array length=1
{33,}Array length=1
{21,45,}Array length=2
{21,45,}Array length=2
{21,45,}Array length=2
{21,45,}Array length=2
{21,45,}Array length=2
{21,36,}Array length=2
{21,}Array length=1
{21,}Array length=1
{0,2,45,}Array length=3
{0,2,45,}Array length=3
{0,1,45,}Array length=3
{0,45,}Array length=2
{0,36,}Array length=2
{0,5,}Array length=2
{0,}Array length=1
{0,2,45,}Array length=3
{0,1,45,}Array length=3
{0,45,}Array length=2
{0,36,}Array length=2
{0,5,}Array length=2
```

->

```
{2,45,}Array length=2
{2,45,}Array length=2
{2,36,}Array length=2
{2,5,}Array length=2
{2,}Array length=1
{1,45,}Array length=2
{1,36,}Array length=2
{1,5,}Array length=2
{1,}Array length=1
{45,}Array length=1
{45,}Array length=1
{45,}Array length=1
{36,}Array length=1
{36,}Array length=1
{5,}Array length=1
longest array size=3
{12,33,45,}
```

Test-5

```
EXECUTE=4
Enter the  number=12

Enter the  number=13

Enter the  number=14

Enter the  number=15

Enter the  number=22

Enter the  number=32

Enter the  number=1

Enter the  number=2

Enter the  number=18

Enter the  number=44
Entered numbers=12,13,14,15,22,32,1,2,18,44,
```

->

```
{12,13,14,15,22,32,44,}Array length=7
{12,14,15,22,32,44,}Array length=6
{12,15,22,32,44,}Array length=5
{12,22,32,44,}Array length=4
{12,32,44,}Array length=3
{12,18,44,}Array length=3
{12,18,44,}Array length=3
{12,18,44,}Array length=3
{12,44,}Array length=2
{12,}Array length=1
{13,14,15,22,32,44,}Array length=6
{13,15,22,32,44,}Array length=5
{13,22,32,44,}Array length=4
{13,32,44,}Array length=3
{13,18,44,}Array length=3
{13,18,44,}Array length=3
{13,18,44,}Array length=3
{13,44,}Array length=2
{13,}Array length=1
{14,15,22,32,44,}Array length=5
{14,22,32,44,}Array length=4
{14,32,44,}Array length=3
{14,18,44,}Array length=3
{14,18,44,}Array length=3
{14,18,44,}Array length=3
{14,44,}Array length=2
{14,}Array length=1
{15,22,32,44,}Array length=4
{15,32,44,}Array length=3
{15,18,44,}Array length=3
{15,18,44,}Array length=3
{15,18,44,}Array length=3
{15,44,}Array length=2
{15,}Array length=1
{22,32,44,}Array length=3
{22,44,}Array length=2
{22,44,}Array length=2
{22,44,}Array length=2
{22,44,}Array length=2
```

->

```
{1,2,18,44,}Array length=4
{1,18,44,}Array length=3
{1,44,}Array length=2
{1,}Array length=1
{2,18,44,}Array length=3
{2,44,}Array length=2
{2,}Array length=1
{18,44,}Array length=2
{18,}Array length=1
{44,}Array length=1
longest array size=7
{12,13,14,15,22,32,44,}
```

Test-6

```
EXECUTE=5
Enter the  number=44

Enter the  number=12

Enter the  number=3

Enter the  number=4

Enter the  number=5

Enter the  number=6

Enter the  number=8

Enter the  number=12

Enter the  number=1

Enter the  number=3
Entered numbers=44,12,3,4,5,6,8,12,1,3,
```

->

```
{44,}Array length=1
{44,}Array length=1
{44,}Array length=1
{44,}Array length=1
{44,}Array length=1
{44,}Array length=1
{44,}Array length=1
{44,}Array length=1
{44,}Array length=1
{44,}Array length=1
{12,}Array length=1
{12,}Array length=1
{12,}Array length=1
{12,}Array length=1
{12,}Array length=1
{12,}Array length=1
{12,}Array length=1
{12,}Array length=1
{12,}Array length=1
{3,4,5,6,8,12,}Array length=6
{3,5,6,8,12,}Array length=5
{3,6,8,12,}Array length=4
{3,8,12,}Array length=3
{3,12,}Array length=2
{3,}Array length=1
{3,}Array length=1
{3,}Array length=1
{4,5,6,8,12,}Array length=5
{4,6,8,12,}Array length=4
{4,8,12,}Array length=3
{4,12,}Array length=2
{4,}Array length=1
{4,}Array length=1
{4,}Array length=1
{5,6,8,12,}Array length=4
{5,8,12,}Array length=3
{5,12,}Array length=2
```

->

```
{4,5,6,8,12,}Array length=5
{4,6,8,12,}Array length=4
{4,8,12,}Array length=3
{4,12,}Array length=2
{4,}Array length=1
{4,}Array length=1
{4,}Array length=1
{5,6,8,12,}Array length=4
{5,8,12,}Array length=3
{5,12,}Array length=2
{5,}Array length=1
{5,}Array length=1
{5,}Array length=1
{6,8,12,}Array length=3
{6,12,}Array length=2
{6,}Array length=1
{6,}Array length=1
{6,}Array length=1
{8,12,}Array length=2
{8,}Array length=1
{8,}Array length=1
{8,}Array length=1
{12,}Array length=1
{12,}Array length=1
{12,}Array length=1
{1,3,}Array length=2
{1,}Array length=1
{3,}Array length=1
longest array size=6
{3,4,5,6,8,12,}
-- program is finished running
```

Functions

This part is in the main function, it detects subsets and saves them in memory

In this part, I used print ,story_long_array and print_long_array functions.

```
#while 3,4,5 subsequance finding loops
while3:
    beq  $t0,40,exit5
    move $s4,$t0 #j=i

    j while4
while3_1:
    addi $t0,$t0,4
    #####
    j while3


while4:

    beq  $s4,40,while3_1
    lb  $s3,myArray($t0)
    move $s5,$s4 #s5=k
    addi $s5,$s5,4
    j  while5
while4_1:
    sb $s3,myArray2($s2)
    jal print              -----> jal instructions
    jal store_long_array
    addi $s2,$zero,0
    addi $s4,$s4,4
    j while4
 #######################################
while5:
    beq  $s5,40,while4_1
    lb  $s6,myArray($s5)
    slt $t1,$s3,$s6 # if s3<s6
    beq $t1,$zero,if_exit#if
    sb  $s3,myArray2($s2)#array2[count]=max;
    addi $s2,$s2,4#count++;
    lb $s3,myArray($s5)#max=array[k];
    if_exit:
    addi $s5,$s5,4
    j  while5
exit5:

    #en uzun arrayin boyutunu basar
    li $v0,4
    la $a0,message3
    syscall
    li $v0,1
    move $a0,$t5
    syscall
    jal print_long_array    -----> jal instruction
    j all_loop
```

Print function

This function prints subsets the screen

```
print:
    addi $t3,$zero,0
    addi $s2,$s2,4
    srl $t4,$s2,2
    li $v0,4
    la $a0,new_line
    syscall
    li $v0,4
    la $a0,message_curly
    syscall
    while_print:
    beq  $t3,$s2,exit_print
    lb   $s7,myArray2($t3)

    li $v0,1
    move $a0,$s7
    syscall

    li $v0,4
    la $a0,virgul
    syscall

    addi $t3,$t3,4
    j while_print
    exit_print:
    li $v0,4
    la $a0,message6
    syscall

    #print length
    li $v0,1
    move $a0,$t4
    syscall
    jr $ra
```

Store_long_array function

This function saves the longes subset to the memory as the 3. array and updates it if a new length comes in

```
#sotere long array in array3 func
store_long_array:
    #countun 4 e bölümü
    srl $t4,$s2,2
    addi $t3,$zero,0

    #en uzun arrayin boyutu hesaplanır
    slt $t1,$t5,$t4 # if t5<t4

    beq $t1,$zero,store_l_exit
    move $t5,$t4

    while_store:
    beq $t3,$s2,store_l_exit
    lb $s7,myArray2($t3)
    sb $s7,myArray3($t3)
    addi $t3,$t3,4
    j while_store
    store_l_exit:
    jr $ra
```

Print_long_array function

This function prints the screen at the end of the program after finding the longest of the subsets

```
#print longest array func
print_long_array:
    addi $t3,$zero,0

    li $v0,4
    la $a0,new_line
    syscall
    sll $s2,$t5,2

    li $v0,4
    la $a0,message_curly
    syscall

    while_print2:
    beq  $t3,$s2,exit_print2
    lb   $s7,myArray3($t3)

    li $v0,1
    move $a0,$s7
    syscall

    li $v0,4
    la $a0,virgul
    syscall

    addi $t3,$t3,4

    j while_print2
    exit_print2:
    li $v0,4
    la $a0,message_curly2
    syscall
    jr $ra
```

My missing part->I did not read the data from the file
My bonus part   -> I tried to print all subsets to the screen

Time & Space Complexity

```c
#include <stdio.h>
#include <stdlib.h>

void print(int array[10],int count){
    printf("************\n");
    for(int i=0;i<count;i++)              ==>  θ(n)        T=θ(n)
        printf("%d,",array[i]);
    printf("\n");
}
void store_long_array(int *max_sayi,int count,int array3[10],int array2[10]){
    if(count>*max_sayi){
        *max_sayi=count+1;
        printf("girdi %d\n",*max_sayi);
        for(int i=0;i<count;i++)          ==>  θ(n)        T=θ(n)
            array3[i]=array2[i];
    }
}
void print_long_array(int max_sayi,int array3[]){
    printf("{");
    for(int i=0;i<max_sayi;i++)           ==>  θ(n)        T=θ(n)
        printf("%d,",array3[i]);
    printf("}");
}

int main()
{
    int array[10]={3, 4, 5, 3, 2, 4, 7, 8, 6,10};
    int max;
    int max_sayi=1;
    int array2[10];
    int array3[10];
    int count=0;
    for(int i=0;i<10;i++){            ==>  θ(n)
        for(int j=i;j<10;j++){       ==>  θ(n)
            max=array[i];
            for(int k=j+1;k<10;k++){ ==>  θ(n)
                if(max<array[k]){
                    array2[count]=max;
                    count++;                        θ(n)        θ(n^2)        θ(n^3)        T=θ(n^3)
                    max=array[k];
                }
            }

            array2[count]=max;
            print(array2,count+1);  θ(n)
            store_long_array(&max_sayi,count,array3,array2);  θ(n)
            count=0;
        }
    }

    printf("%d en uzun",max_sayi);
    print_long_array(max_sayi,array3);  ==>  θ(n)
    return 0;
}
```

SPACE COMPLEXITY= datas not dynamic so ->O(1)

TİME COMLEXİTY=θ(n^3)