

CPE101 Programming Languages I

Week 6

Examples and Analysis of Algorithms

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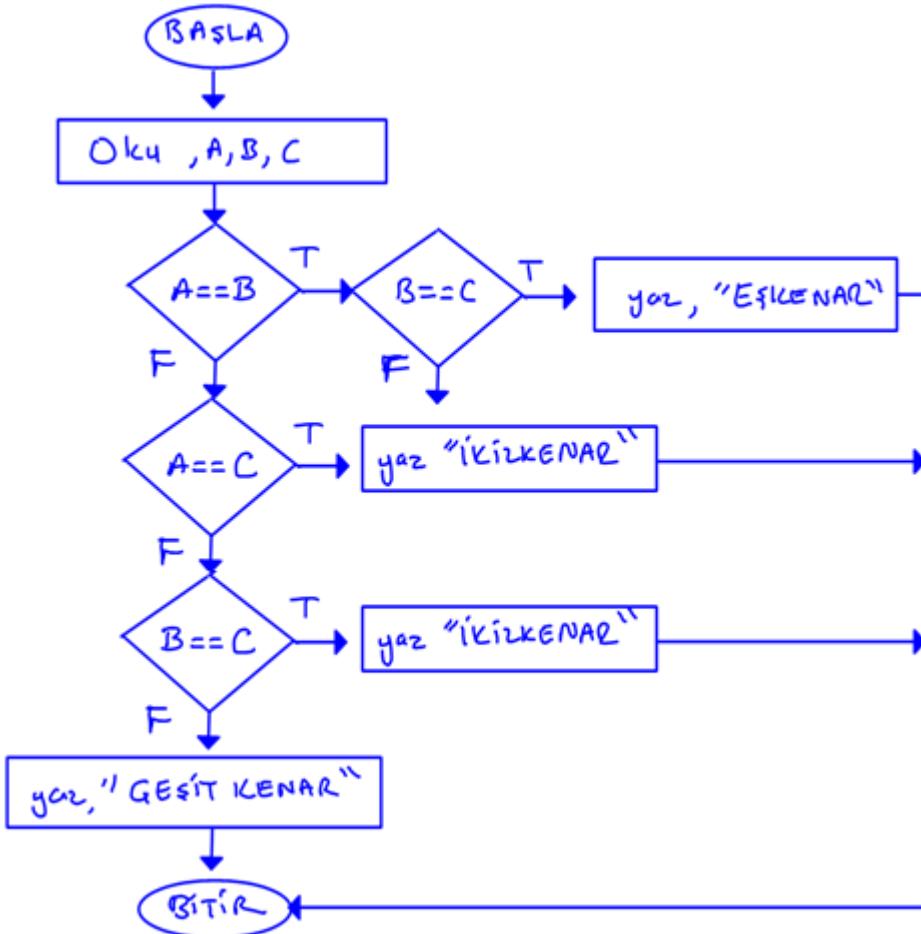
You have two options at any given moment. You can either step forward into growth or step back into safety. A. Maslow

**Example: According to the specified edges of a triangle,
find out which varieties**

Algorithm

- 1) Start
- 2) Read edges a, b and c.
- 3) If ($a = b$) and ($b = c$) Then
Print “equilateral” Go Step 6
- 4) If ($a = c$) or ($b = c$) Then
Print “isosceles” Go Step 6
- 5) Else Print “scalene”
- 6) Stop

Flow Chart

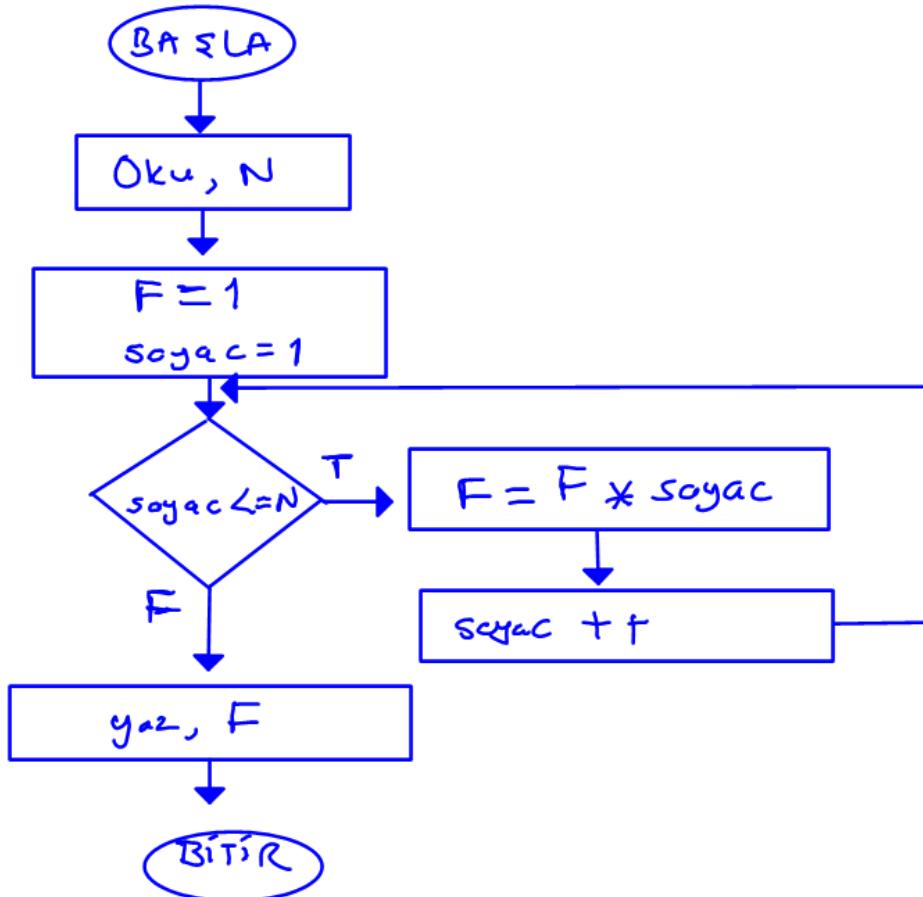


Example: Take the factorial of N number entered from the keyboard

Algorithm

1. Start
2. Read N
3. factorial = 1
4. counter = 1
5. while counter <= N
 factorial = factorial * counter
 counter ++
6. print, factorial
7. End

Flow Chart

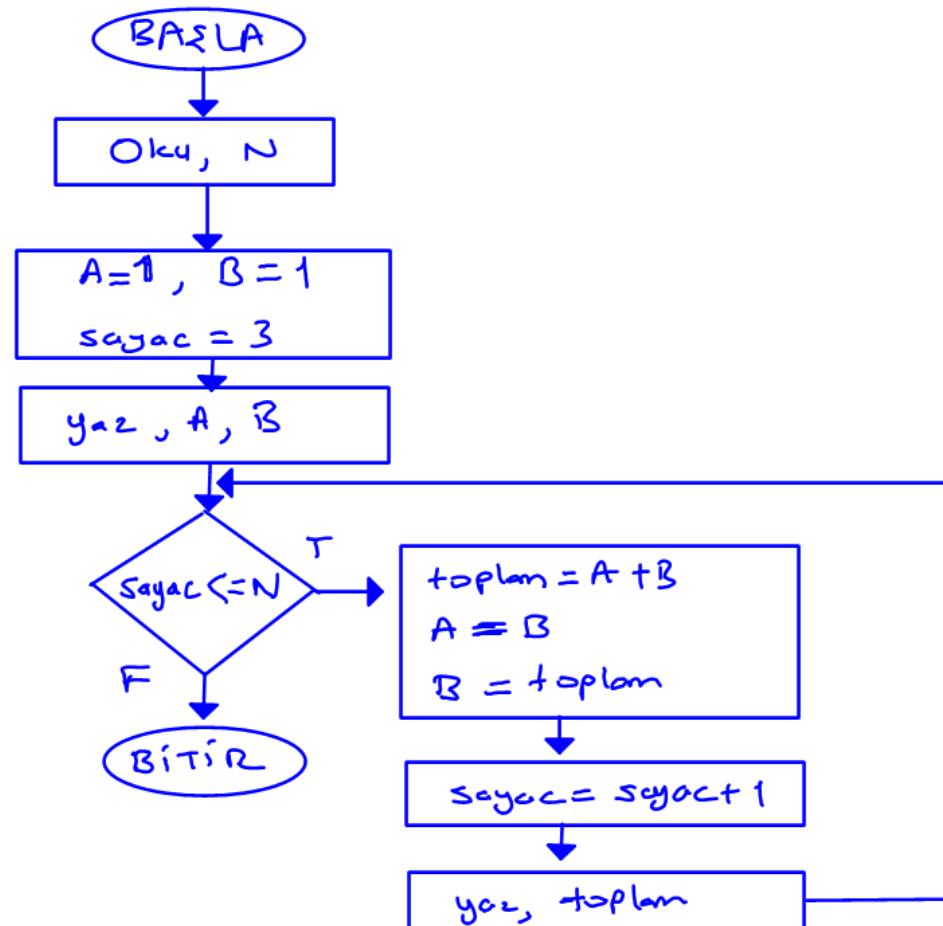


Example: Finding Fibonacci number for the first N terms

Algorithm

```
1.Start  
2.Read N  
3.A=1, B=1  
4.counter=3  
5.print, A  
6.print, B  
7.while counter <= N  
    total = A+B  
    print, total  
    A=B  
    B=total  
    counter++  
8.End
```

Flow Chart

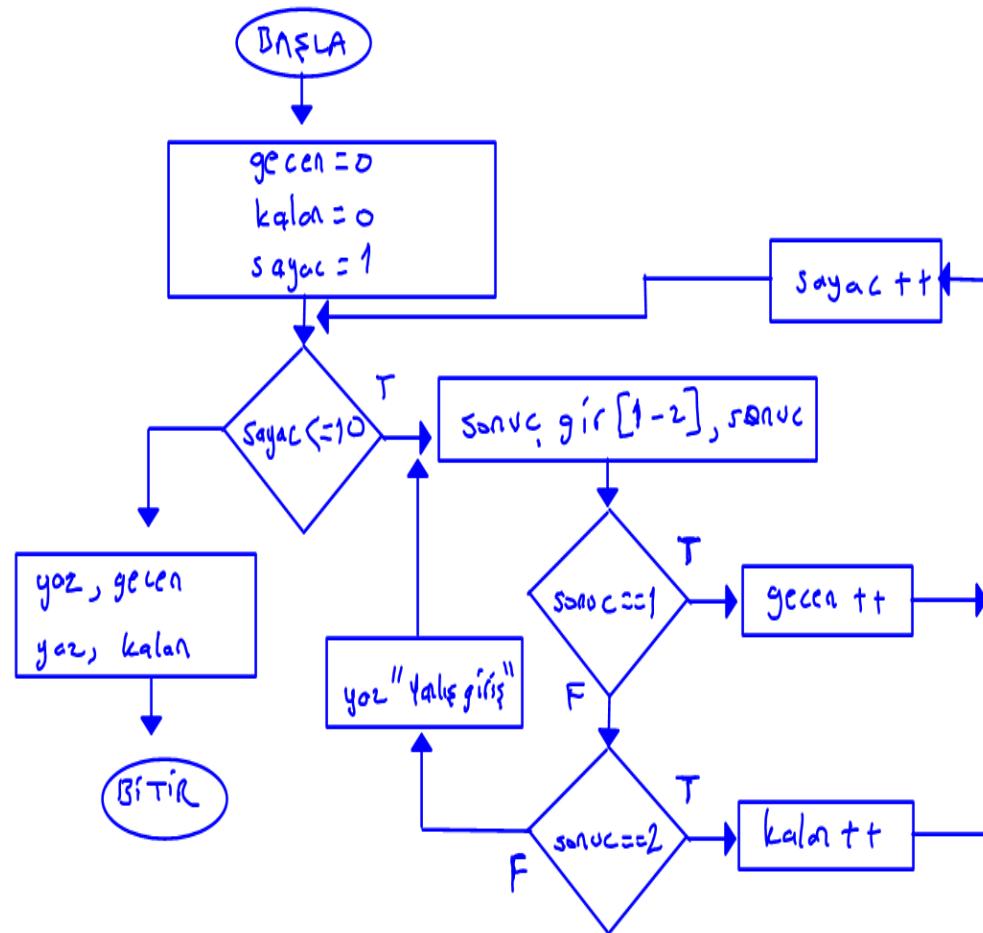


Example

- Test results of 10 students are given from keyboard as 1(passed) or 2(failed).
- Draw flowchart of an algorithm that prints out how many student has passed and how many failed.

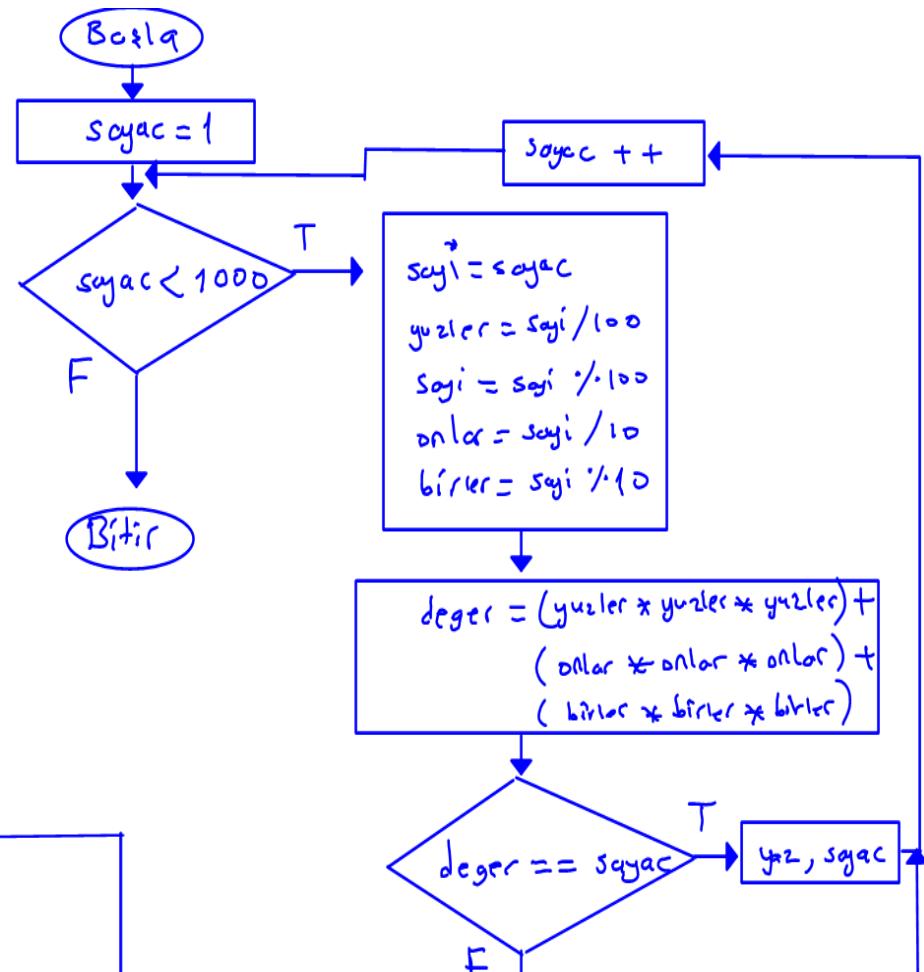
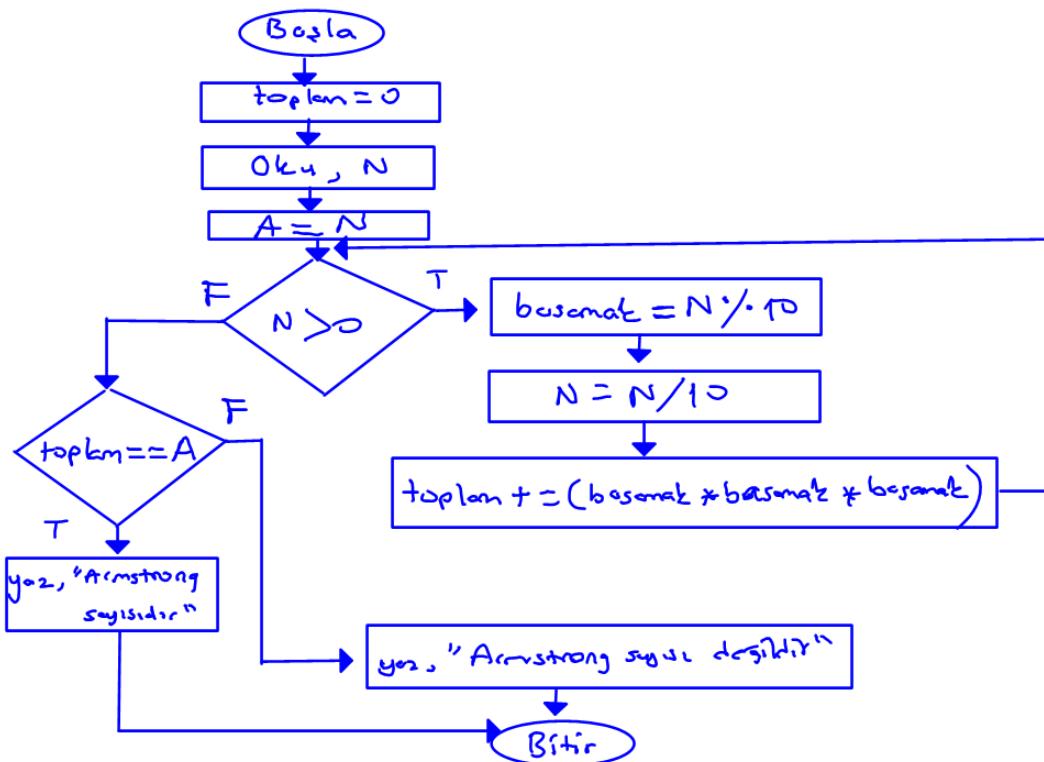
Example

```
1. Begin
2. passes = 0
3. fails=0
4. counter = 1
5. while counter <=10
   enter result, result
   if result == 1
      passes++
   else if result == 2
      fails++
   else
      print, "invalid result input"
      counter++
6. print, passes
7. print, fails
8. End
```



Example

- Flowchart of a program that prints all 3-digit Armstrong numbers.



Example: Finding Number

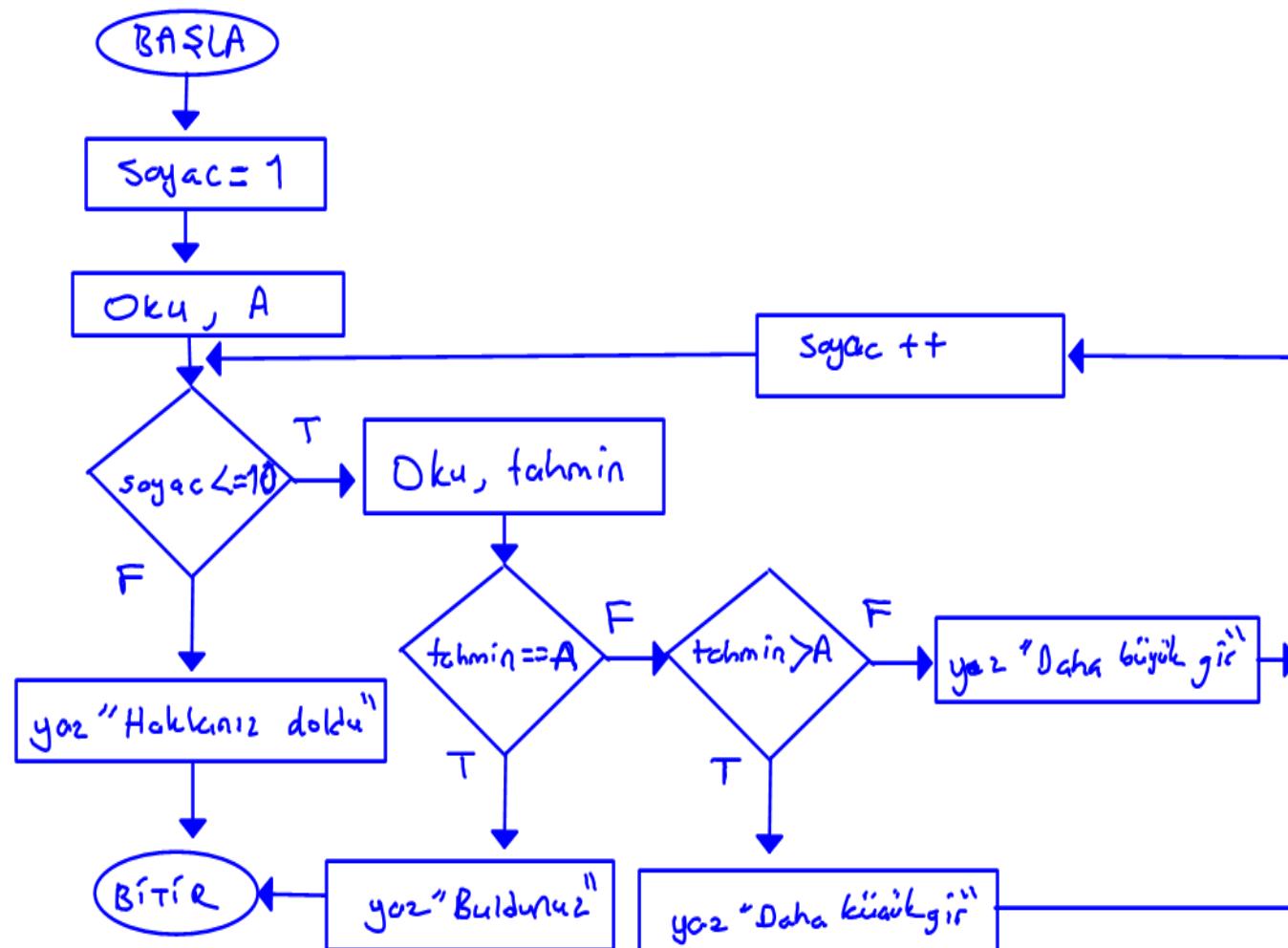
Computer holds a random number between 0-100. Match this number with the input from the keyboard which is user entered.

If number is matched, show message on the screen as "Congratulations, you find in the trial of ...". If number is not matched, show message on the screen as "You can not find the number of ... attempts, try again". If number is not find with 10 attempts show message on the screen as "Sorry, You can not find the number of 10 attempts" and exit. Prepare the algorithm and flow chart of the program.

Note: Random number produced with computer between 0-100 is x. The number of attempts of the user is ds.

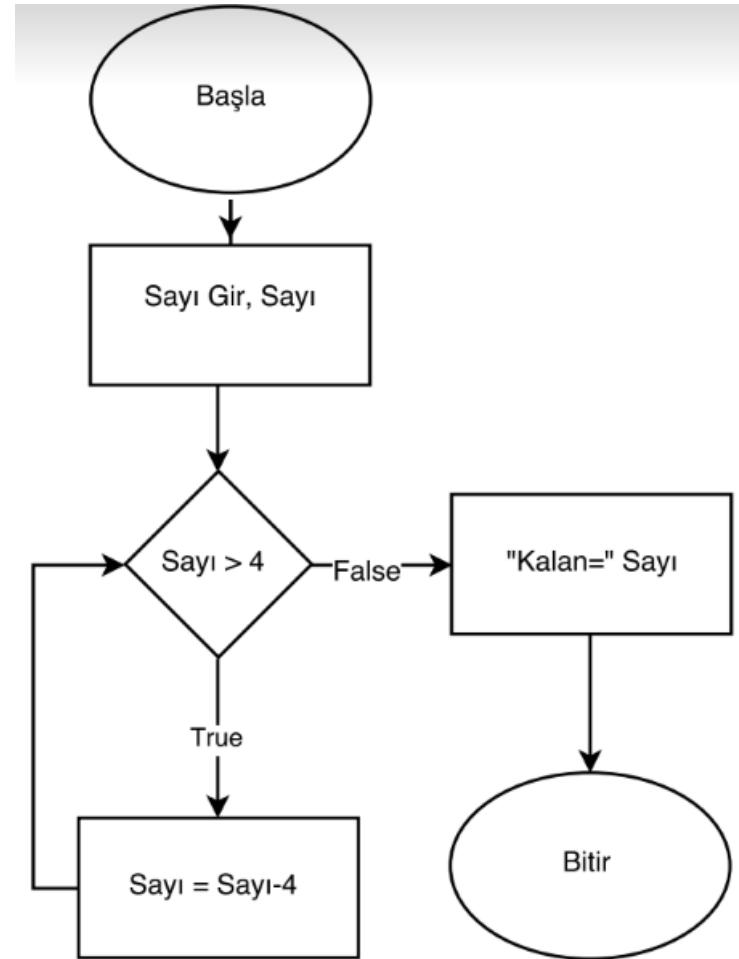
Number entered from user is a.

Example: Finding Number



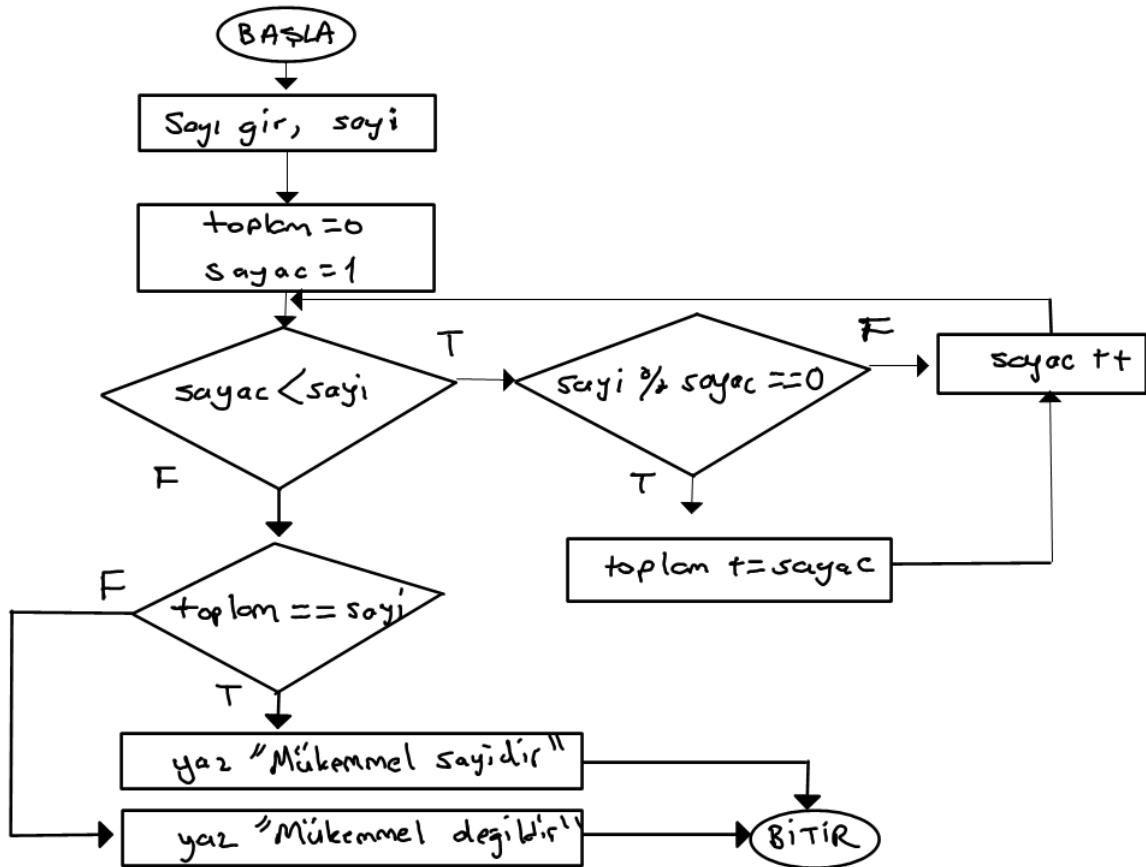
Draw a flowchart of an algorithm that finds remainder of a number by 4 without using remainder operator (%).

1. Start
2. Enter number , N
3. While $N > 4$ repeat
$$N = N - 4$$
4. remainder = N
5. Print remaidner
6. End

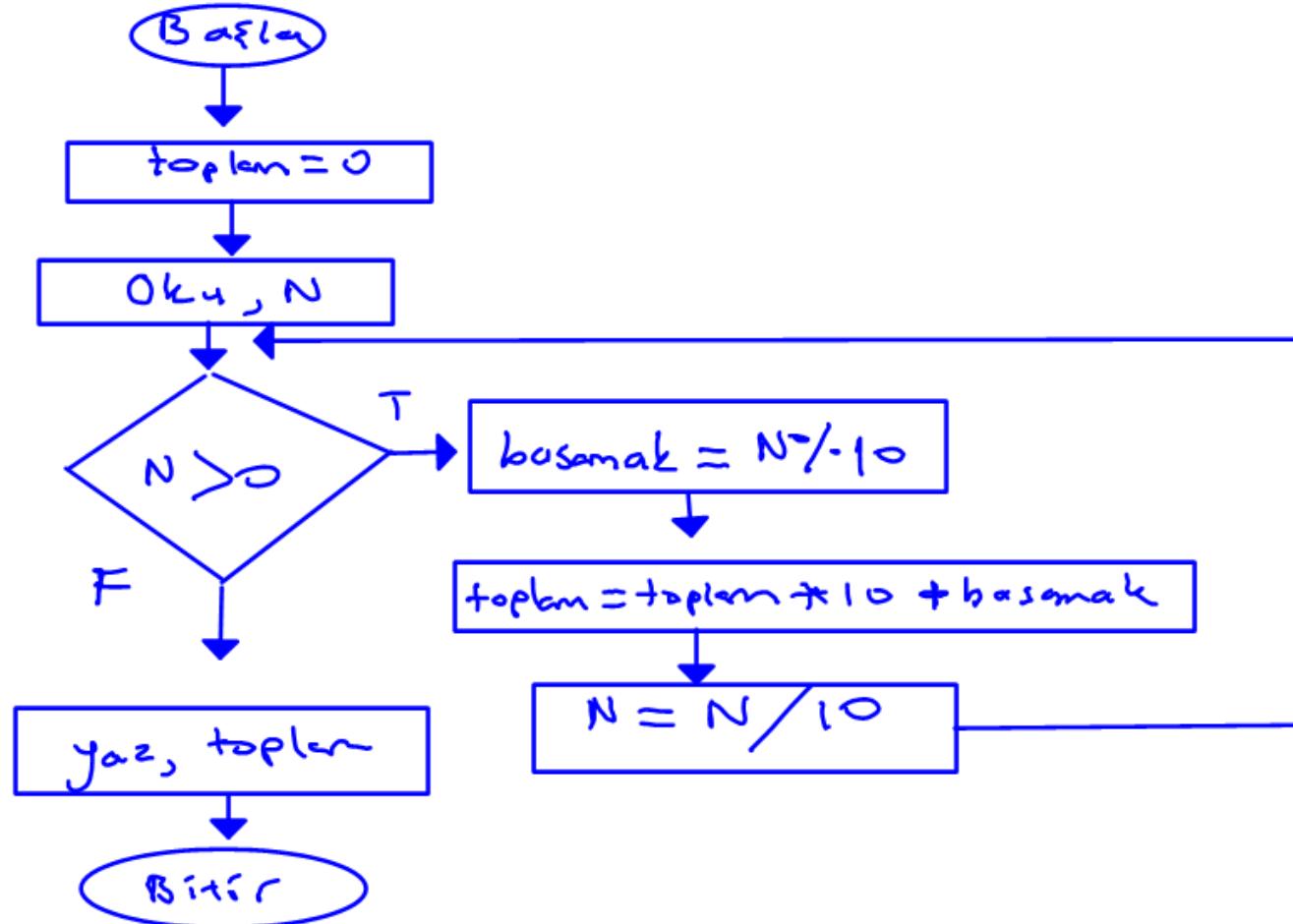


Draw a flowchart of an algorithm that determines if a number entered from keyboard is a perfect number or not.

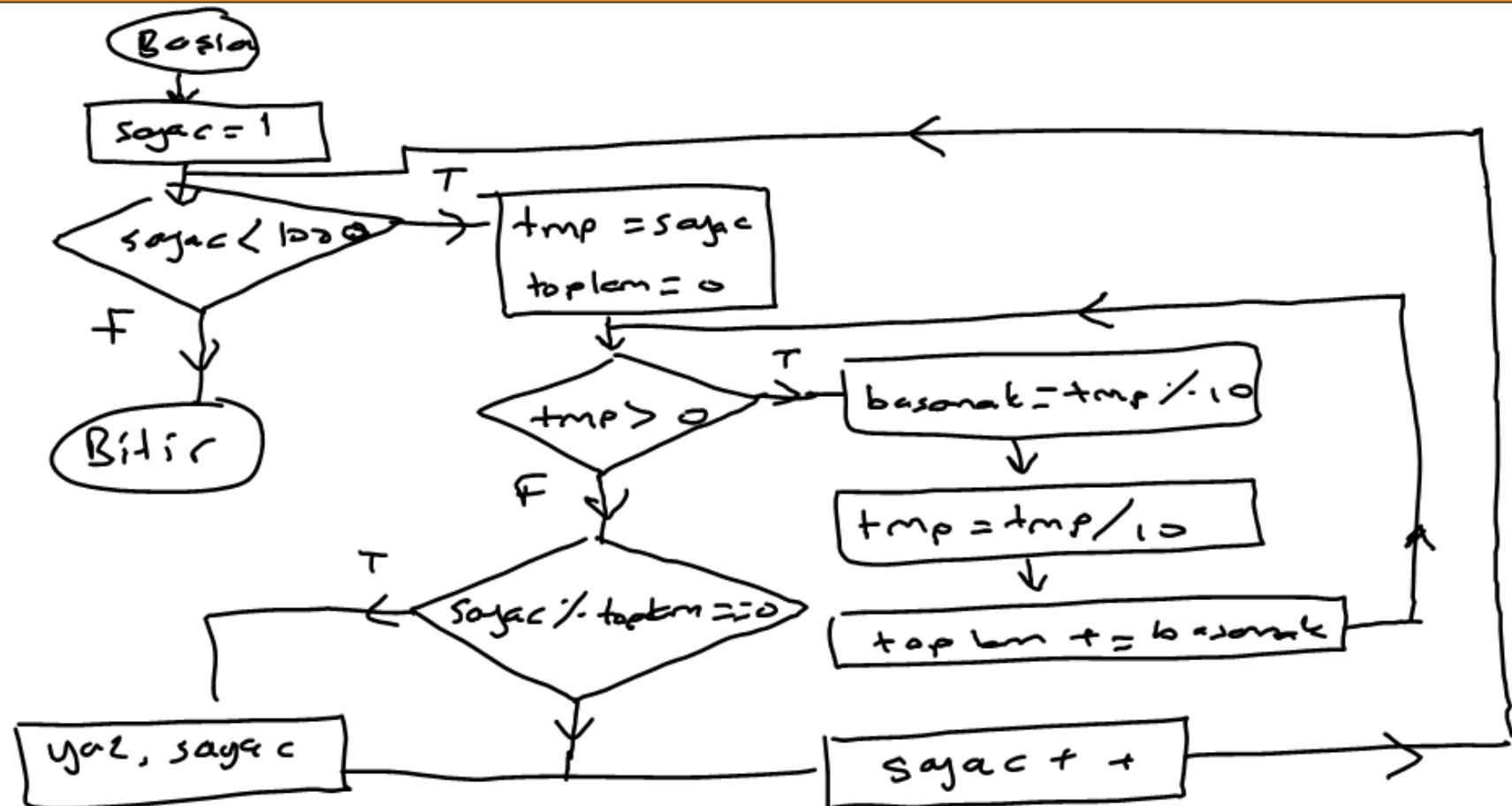
```
1.Start
2.Enter number, A
3.total = 0
4. counter= 1
5. While counter < A repeat
   if A%counter == 0 then
      total += counter
      counter++
6. if total == A
   print "Perfect number"
7. else
   print "Not perfect number"
8.End
```



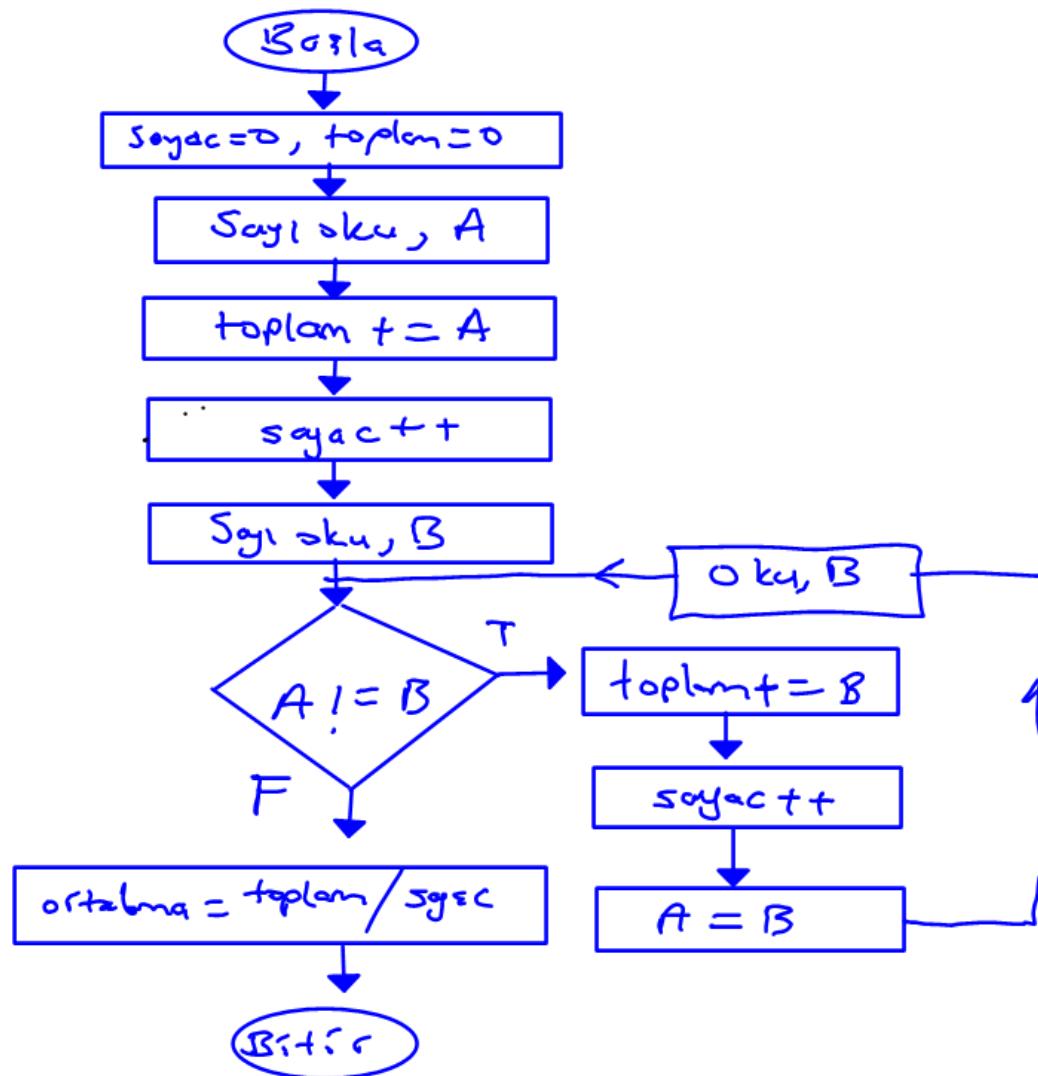
Draw a flowchart of an algorithm that prints a number that has reverse digit order of original number.



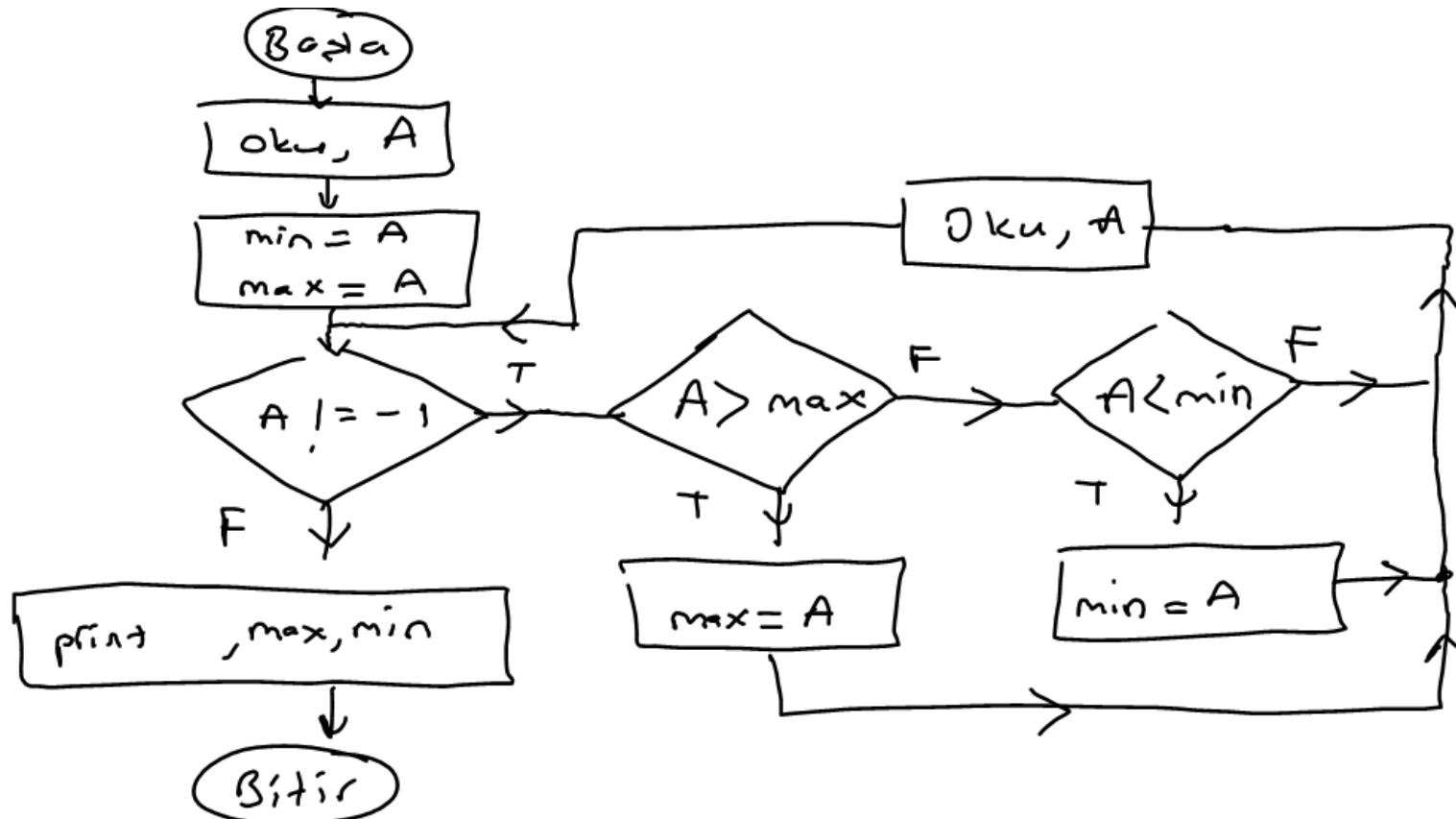
Draw a flowchart of an algorithm that prints all Harshad Numbers less than 1000.



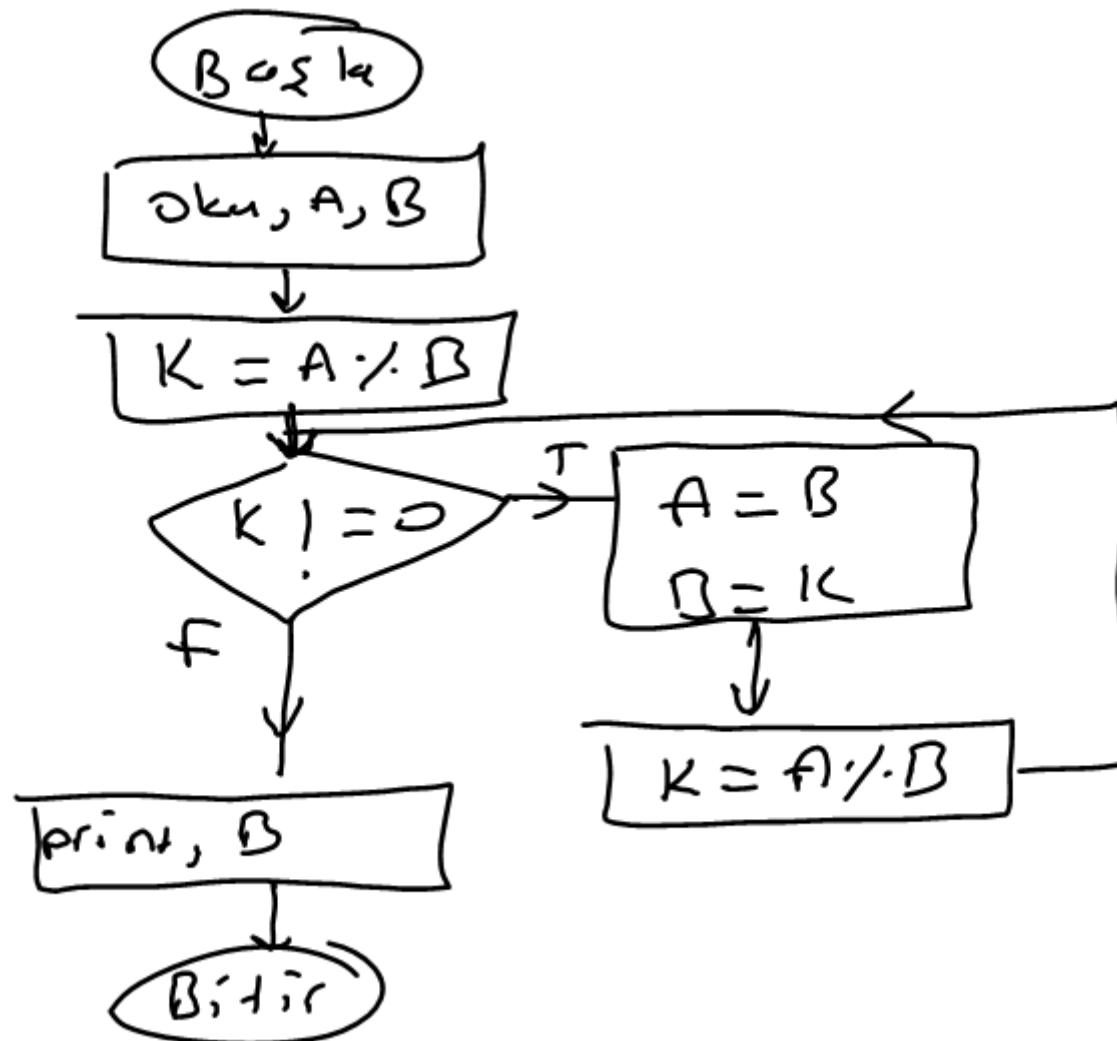
Draw a flowchart of an algorithm that calculates and prints the average of all numbers entered in an input process that ends when user puts two **same consecutive numbers** from keyboard.



Draw a flowchart of an algorithm that takes numbers from keyboard unless -1 is put and finds maximum and minimum of numbers entered since beginning.



Draw a flowchart of an algorithm that finds the greatest common divisor of two given numbers.



References

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- ▶ Kaan Aslan, “A’dan Z’ye C Klavuzu 8. Basım”, Pusula Yayıncılık, 2002.
- ▶ Paul J. Deitel, “C How to Program”, Harvey Deitel.
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