

Module 8 Example: Converting decimal to binary and vice versa

Write a python program to convert a decimal number into a binary number and vice versa.

The program must do the following:

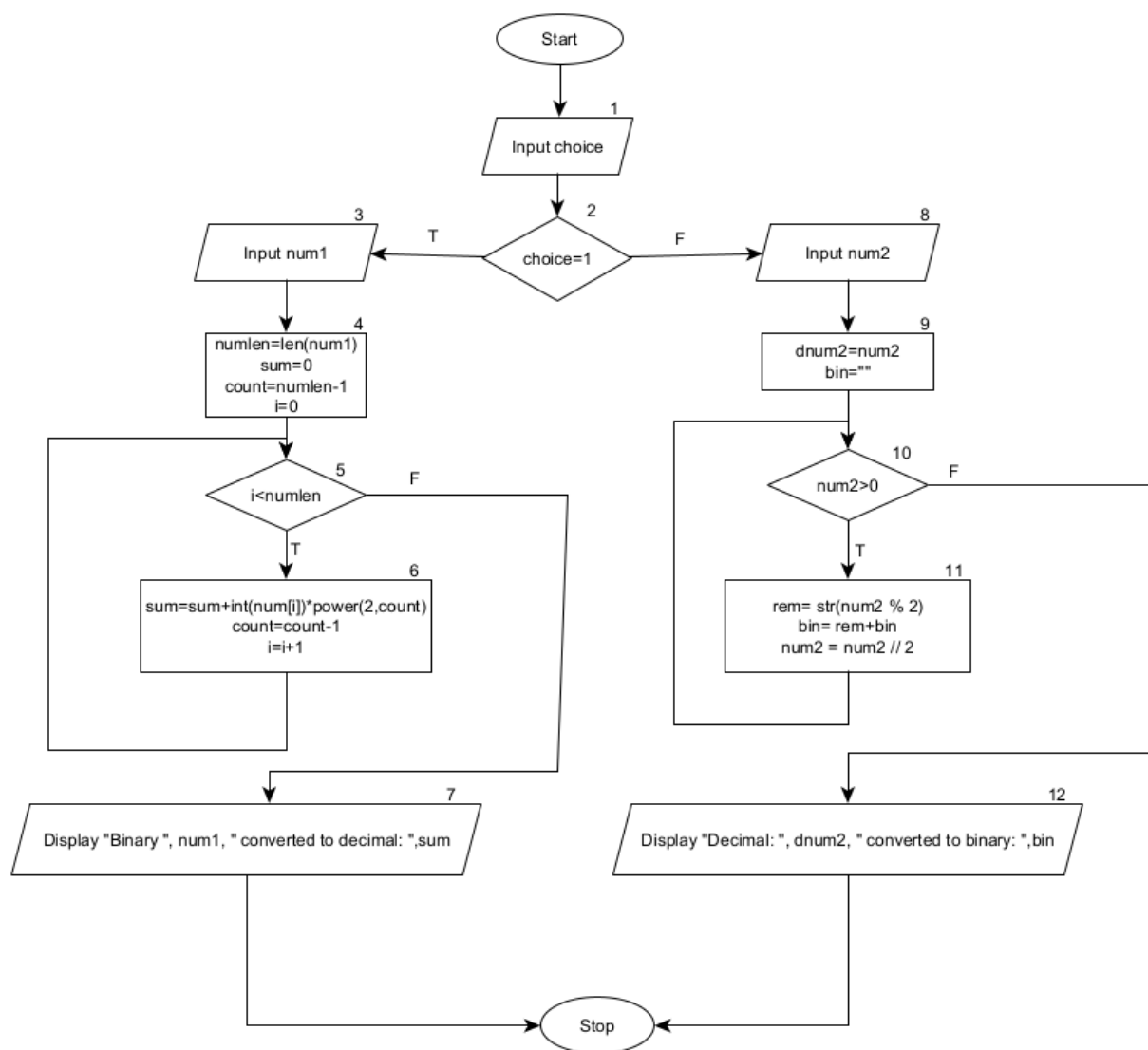
- Present the user with a choice to either select menu option 1 or option 2:
 - 1: Convert a binary number to decimal
 - 2: Convert a decimal number to binary
- Depending on the selection the user makes, display the answer with an appropriate message.

Do the following:

- Create an IPO chart for the program

INPUT	PROCESSING	OUTPUT
Enter choice	If choice =1 then	num1, sum
Enter num1	num1=enter binary number numlen=length(num1) sum =0 count = numlen -1 for i=1 to count sum=sum + int(num[i]) * pow(2,count) count=count -1 print ("Binary number: ", num1,"converted to decimal: ", sum)	
Enter num2	else enter decimal number <i>num2</i> dnum2=num2 bin="" loop while num2>0 rem = str(num2 % 2) bin=rem+bin num2=num2 // 2 print ("Decimal number: ", dnum2,"converted to binary: ",bin)	dnum2, bin

- Create a flowchart for the program



- Draw a trace table for the flowchart using the input values: 1 and 111.

Box No	Name of variables						Decisions		Output
	choice	Num1	Numlen	Sum	Count	i	Choice=1	I<numlen	
1	1								
2							T		
3		111							
4			3	0	2	0			
5								T	
6				4	1	1			
5								T	
6				6	0	2			
5								T	
6				7	-1	3			
5								F	

7									Binary: 111 converted to decimal: 7
Stop									

- Draw a trace table for the flowchart using the input values: 2 and 10.

Box No	Variables					Decisions		Output
	choice	num2	dnum2	bin	rem	Choice=1	Num2>0	
1	2							
2						F		
8		10						
9			10	""				
10							T	
11		5		0	0			
10							T	
11		2		10	1			
10							T	
11		1		010	0			
10							T	
11		0		1010	1			
10							F	
12								Decimal: 10 converted to binary: 1010
Stop								

- Create the Python program

Python Code

```
print("1 Binary to Decimal")
print("2 Decimal to Binary")
print()
choice=int(input("Enter your choice( 1 or 2): "))
if choice==1:
    # Converts binary to decimal
    num1=input("Enter a binary number: ")
    numlen=len(num1)
    sum=0
    count=numlen-1
    for i in range (0,numlen):
        sum=sum+ int(num1[i])*pow(2,count)
        count=count-1
    print("Binary: ",num1," converted to decimal: ",sum)
else:
    # Converts decimal to binary
    num2 = int(input("Enter a decimal number: "))
    dnum2 = num2
    bin = ""
    while num2 > 0:
        rem = str(num2 % 2)
```



```
bin = rem + bin
num2 = num2 // 2
print("Decimal: ", dnum2, " converted to binary: ", bin)
```

Output

Sample Run 1

```
1 Binary to Decimal
2 Decimal to Binary

Enter your choice( 1 or 2): 1
Enter a binary number: 110
Binary: 110 converted to decimal: 6
```

Sample Run 2

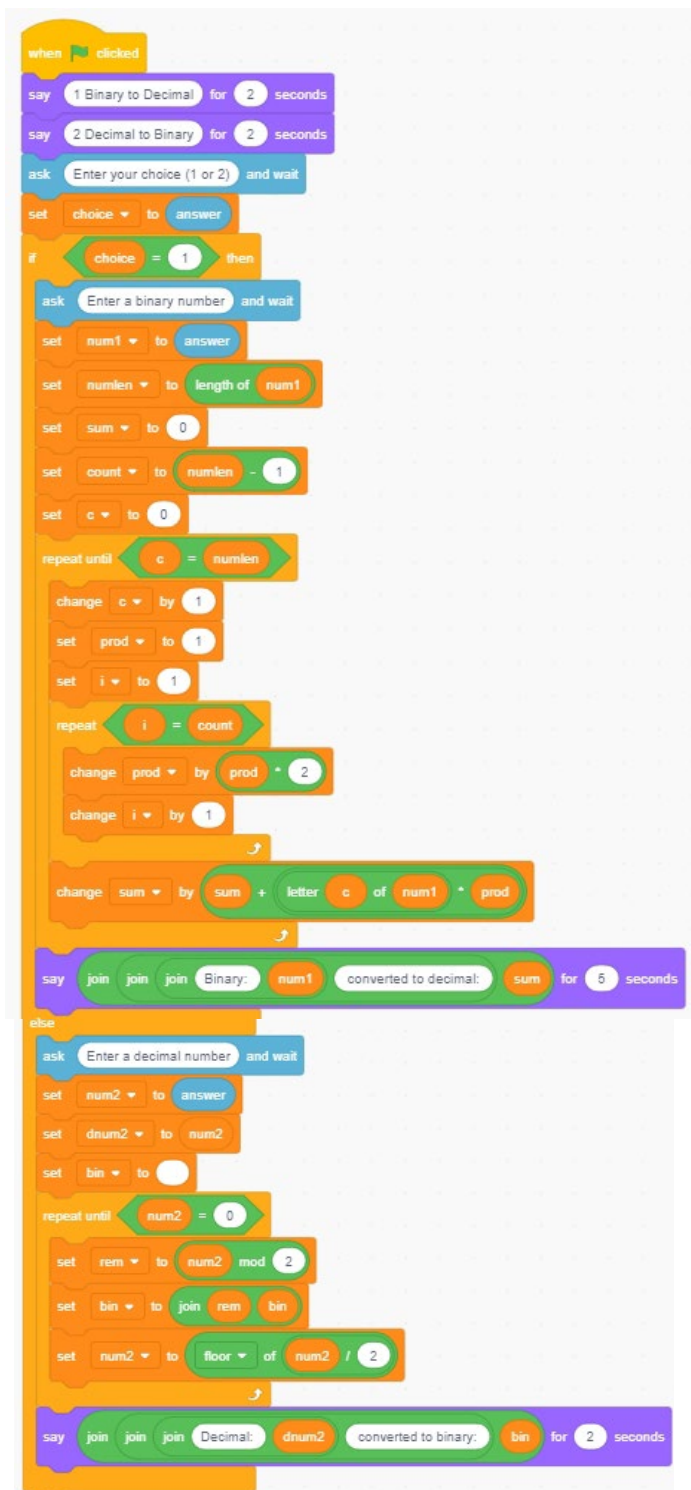
```
1 Binary to Decimal
2 Decimal to Binary

Enter your choice( 1 or 2): 2
Enter a decimal number: 10
Decimal number: 10 converted to binary: 1010
```

- Create the Scratch Program



Scratch Program



Output

Sample output 1

Sample output 2





Binary: 1101 converted to decimal: 13



Decimal: 9 converted to binary: 1001

