**Lab Assignment 1**

**20CO203P – Digital Electronics and Computer Organization Lab**

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Question 1:--

Write a program to convert one number from one base to another base. User will give three inputs:

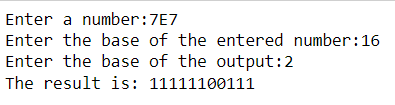
1. Input number base
2. Number
3. Output number base

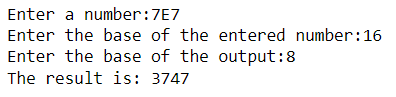
Python Program:

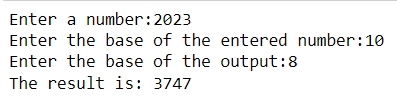
# Function to convert Base to Decimal

**def** base2dec(num):  
 **if** 20 >= base\_input >= 11: *# If statement to seperate numbers with base greater than 10* dict = {**"0"**: 0, **"1"**: 1, **"2"**: 2, **"3"**: 3, **"4"**: 4, **"5"**: 5, **"6"**: 6, **"7"**: 7,  
 **"8"**: 8, **"9"**: 9, **"A"**: 10, **"B"**: 11,  
 **"C"**: 12, **"D"**: 13, **"E"**: 14, **"F"**: 15, **"G"**: 16,  
 **"H"**: 17, **"I"**: 18, **"J"**: 19}*# Define a dictionary to store conversion values*  
 output = 0 *# Declare a variable output whose value is initially zero* j = 1  
 **for** term **in** num: *# For loop is used to traverse the digits of the number* output = output+dict[term]\*(16\*\*(len(num)-j)) *# the number is converted to the user defined radix* j = j+1  
 **return** output *# Output is returned* **else**: *# Else Statement for numbers with base less than 10* output = 0  
 j = 1  
 **for** i **in** num:  
 **if** int(i)>base\_input: *# Validation of the entered number* print(**"Enter a valid Number"**)  
 output = output+int(i)\*(base\_input\*\*(len(num)-j)) *# The output is converted to the user defined base* j = j+1  
 **return** output *# Output is returned  
  
# Function to convert Decimal to Base*out\_rev = [] *# Declare an empty list to strore output value***def** dec2base(num):  
 **if** 20 >= base\_output >= 11: *# If statemenet to seperate numbers with base greater than 10* rem = num % base\_output *# Remainder is calculated* quotient = int(num/base\_output) *# Quotient in calculated and converted to int datatype* **if** rem == 10: *# Combination of If and Elif statements for bases greater than 10* rem = **"A"  
 elif** rem == 11:  
 rem = **"B"  
 elif** rem == 12:  
 rem = **"C"  
 elif** rem == 13:  
 rem = **"D"  
 elif** rem == 14:  
 rem = **"E"  
 elif** rem == 15:  
 rem = **"F"  
 elif** rem == 16:  
 rem = **"G"  
 elif** rem == 17:  
 rem = **"H"  
 elif** rem == 18:  
 rem = **"I"  
 elif** rem == 19:  
 rem = **"J"** out\_rev.append(str(rem)) *# remainder is appended to empty list* **if** quotient != 0:  
 dec2base(quotient) *# Function recursion is used to run the process again till the quotient is zero* **else**:  
 out\_rev.reverse() *# String is reversed* string = **''**.join(out\_rev) *# The datatype of output is changed* print(**"The result is:"**, string)  
 **else**: *# Else statement for numbers with base less than 10* rem = num % base\_output *# remainder is calculated and stored in rem* out\_rev.append(rem) *# remainder is appended to the list out\_rev* quotient = int(num/base\_output) *# Quotient is calculated and stored in quotient* **if** quotient != 0:  
 dec2base(quotient) *# Function recursion is used to repeat the process till the quotient is zero* **else**:  
 out\_rev.reverse() *# String is reversed* x = 0  
 **for** current\_digit **in** out\_rev: *# the string is converted to integer datatype* x = x\*10+current\_digit  
 print(**"The result is:"**, x) *# The result is printed*number = input(**"Enter a number:"**) *# User defined input is taken for the number*base\_input = int(input(**"Enter the base of the entered number:"**)) *# User defined input is taken for input base*base\_output = int(input(**"Enter the base of the output:"**)) *# User defined input is taken for output base*dec = base2dec(number) *# The number with any base is converted to decimal using predefined function*dec2base(dec) *# The decimal number is converted to the user defined base using predefined function*

Output:







Question 2:-

write a program to add two number. Input for the program are two and their base output of the program will be addition in the given base.

Python Program:

*# Function to number of any base to decimal*

**def** base2dec(num):  
 **if** 20 >= base >= 11: *#If statement to seperate numbers with base greater than 10* dict = {**"0"**: 0, **"1"**: 1, **"2"**: 2, **"3"**: 3, *#Define a dictionary to store conversion values* **"4"**: 4, **"5"**: 5, **"6"**: 6, **"7"**: 7,  
 **"8"**: 8, **"9"**: 9, **"A"**: 10, **"B"**: 11,  
 **"C"**: 12, **"D"**: 13, **"E"**: 14, **"F"**: 15, **"G"**: 16,  
 **"H"**: 17, **"I"**: 18, **"J"**: 19}  
 output = 0 *# Declare a variable output whose value is initially zero* j = 1  
 **for** term **in** num: *# For loop is used to traverse the digits of the number* output = output+dict[term]\*(16\*\*(len(num)-j)) *# the number is converted to the user defined radix* j = j+1  
 **return** output *# Output is returned* **else**: *# Else Statement for numbers with base less than 10* output = 0  
 j = 1  
 **for** i **in** num:  
 **if** int(i) > base: *# Validation of the entered number* print(**"Enter a valid Number"**)  
 output = output+int(i)\*(base\*\*(len(num)-j)) *# The output is converted to the user defined base* j = j+1  
 **return** output *# Output is returned  
  
# Function to convert decimal number to any base*out\_rev = [] *# Declare an empty list to strore output value***def** dec2base(num):  
 **if** base == 16: *# If statemenet to seperate numbers with base greater than 10* rem = num % base *# Remainder is calculated* quotient = int(num/base) *# Quotient in calculated and converted to int datatype* **if** rem == 10: *# Combination of If and Elif statements for bases greater than 10* rem = **"A"  
 elif** rem == 11:  
 rem = **"B"  
 elif** rem == 12:  
 rem = **"C"  
 elif** rem == 13:  
 rem = **"D"  
 elif** rem == 14:  
 rem = **"E"  
 elif** rem == 15:  
 rem = **"F"** out\_rev.append(str(rem)) *# remainder is appended to empty list* **if** quotient != 0:  
 dec2base(quotient) *# Function recursion is used to run the process again till the quotient is zero* **else**:  
 out\_rev.reverse() *# String is reversed* string = **''**.join(out\_rev) *# The datatype of output is changed* print(string)  
 **else**: *# Else statement for numbers with base less than 10* rem = num % base *# remainder is calculated and stored in rem* out\_rev.append(rem) *# remainder is appended to the list out\_rev* quotient = int(num/base) *# Quotient is calculated and stored in quotient* **if** quotient != 0:  
 dec2base(quotient) *# Function recursion is used to repeat the process till the quotient is zero* **else**:  
 out\_rev.reverse() *# String is reversed* x = 0  
 **for** current\_digit **in** out\_rev: *# the string is converted to integer datatype* x = x\*10+current\_digit  
 print(x) *# The result is printed*num1 = input(**"Enter first number:"**) *# User input is taken for the first number*num2 = input(**"Enter second number:"**) *# User input is taken for the second number*base = int(input(**"Enter the base of the numbers:"**)) *# User input is taken for the base*num3 = base2dec(num1)+base2dec(num2) *# The numbers are converted to decimal and added*dec2base(num3) *# the numbers are converted back to users required base*

Output:

