# Assignment 1

# MAS DSE200

## Instructions

- The homework should be submitted via Canvas.
- You don't need to explain your approach (unless specified) so please be concise in your submission.
- To obtain full marks for a question, both the answer and the code should be correct.
- Completely wrong (or missing) code with correct answer will result in zero marks.
- Please code the solution in the space provided.

### 1. Write a program to swap a string and an int variable and print their data types to verify the swapping operation

- Initialize 2 variables my_int = 5 , and my_str = "Hi"
- Swap these variables such that my_int now holds the value of my_str and vice versa
- Verify this by printing their data types

In [1]:
```
# COMPLETE THE CELL BELOW

my_int = 5
my_str = "Hi"

swap = my_int

my_int = my_str
my_str = swap

print ("Value of my_int = ", my_int)
print ("Data type of my_int = ", type(my_int))
print ("Value of my_str = ", my_str)
print ("Data type of my_str = ", type(my_str))
```

```
Value of my_int =  Hi
Data type of my_int =  <class 'str'>
Value of my_str =  5
Data type of my_str =  <class 'int'>
```

### 2. Write a Python Program to Calculate the length of the diagonal of a rectangle

- Initialize the 2 sides of the rectangle a and b to 5 and 6
- Calculate the length of the diagonal using the formula - diagonal = √(a^2 + b^2)

In [2]:
```
# COMPLETE THE CELL BELOW
import math

a = 5
b = 6

diagonal = math.sqrt(a**2 + b**2) # calculate the diagonal length

print('The length of the diagonal of the rectangle is %0.2f' %diagonal)
```

```
The length of the diagonal of the rectangle is 7.81
```

### 3. Write a Python Program to Check if a Number is divisible by 3

- Initialize a variable that takes input from user
- Check and print if the number is divisible by 3

In [3]:
```
# COMPLETE CELL BELOW

num = int(input("Please enter a number: ")) # Take input from user

# Check if the number is divisible by 3
if num % 3 == 0:
    print ("{} is divisible by 3.".format(num))
else:
    print (("{} is NOT divisible by 3.".format(num)))
```

```
7839 is divisible by 3.
```

### 4. Write a Python Program to Check if a number has exactly 3 digits(no zeros allowed at the beginning and the number can be assumed to be positive)

- Initialize a variable that takes input from user(input will be given as a string)
- Check and print if the number has exactly 3 digits(no zeros allowed at the beginning)
- Read about type casting in python and use type casting from string to int

In [4]:
```
# COMPLETE THE CELL BELOW

num = str(input("Please enter a number: ")) # Take input from user

# Check if the number has exactly 3 digits
if len(num) == 3 and int(num)/100 >= 1:
    print ("{} has exactly 3 digits(no zeros allowed at the beginning).".format(num))
else:
    print ("{} doesn't have exactly 3 digits(no zeros allowed at the beginning).".format(num))
```

```
659 has exactly 3 digits(no zeros allowed at the beginning).
```

### 5. Write a Python Program to Check Whether a String is Palindrome or Not

- Initialize a string
- Lower case it to allow easy comparison
- Check using if-else statements if the string is a palindrome
- A palindrome is a string which is same read forward or backwards.

In [5]:
```
# COMPLETE CELL BELOW

my_str = 'YckaIbohPhoBiAKCy' # change this value for a different output

l = my_str.lower()

for i in range(0,len(l)):
    if l[i] == l[len(l)-i-1]:
        if (i == len(l) - 1 - i) and (len(l)%2 == 1)) or ((i == len(l) - 2 - i) and (len(l)%2 == 0)):
            print ("{} is a Palindrome.".format(my_str))
    else:
        print ("{} isn't a Palindrome.".format(my_str))
        break
```

```
YckaIbohPhoBiAKCy is a Palindrome.
```

### 6. Print numbers divisible by 5 between 4 and 30, inclusive

- Iterate through the numbers in the for loop and notice the way range has been used to generate numbers in the for loop
- Print only the numbers divisible by 5 using if statement

In [6]:
```
# COMPLETE THE CELL BELOW

limit = range(4,31)
for number in limit: # Complete the loop
    if number % 5 == 0:
        print(number)
```

```
5
10
15
20
25
30
```

### 7. Write a Python Program to print the first n numbers of the Fibonacci series starting from 0

- Initialize a variable n that denotes the number of elements of the Fibonacci series to be computed
- Use a loop to print the first n numbers of the Fibonacci series: 0,1,1,2,3,....

In [7]:
```
# COMPLETE CELL BELOW

n = 5
f_list = []

for i in range(0, n):
    if i == 0:
        f_list.append(0)
    elif i == 1:
        f_list.append(f_list[0] + 1)
    else:
        f_list.append(f_list[i-1] + f_list[i-2])

print ("The first {} numbers of the Fibonacci series is {}.".format(n, f_list))
```

```
The first 5 numbers of the Fibonacci series is [0, 1, 1, 2, 3].
```

### 8. Write a Python Program that defines a function to Remove Vowels From a String

- You can initialize a string of your choice
- Define the function
- Use a for loop to remove vowels

In [8]:
```
# COMPLETE THE CELL BELOW

vowels = '''aeiouAEIOU''' # define vowels

def removeVowel(s): # Complete the function using a for loop
    s = [i for i in s if i not in vowels]
    return s

my_str = "Hello, how are you?. I hope you are doing well."
# my_str = input("Enter a string: ") # To take input from the user

print (removeVowel(my_str))
```

```
['H', 'l', 'l', ',', ' ', 'h', 'w', ' ', 'r', ' ', 'y', '?', '.', ' ', ' ', 'h', 'p', ' ', 'y', ' ', 'r', ' ', 'd', 'n', 'g', ' ', 'w', 'l', 'l', '.']
```

### 9. Write a program to define a function that takes two numbers as arguments and returns the sum of all numbers between the arguments passed (exclusive, i.e. excluding the limits)

- You can define a range of your choice
- Define the function
- Use a for loop to add numbers within the range(exclusive)

In [9]:
```
# COMPLETE THE CELL BELOW

def sum(a, b): # Complete the function using a for loop and use range() to iterate over the numbers

    if a < b:
        step = 1
    elif a > b:
        step = -1
    else:
        return 0

    t = 0
    for i in range(a + step, b, step):
        t += i
    return t

a = 5
b = 10
total = sum(a, b)
print ("Result is", total)
```

```
Result is 30
```

### 10. Define a class named Triangle that can calculate the area

- The class can be constructed by the length of the sides
- The class has a method which can compute the area using the formula area = √(s(s-a)(s-b)(s-c)) where s=(a+b+c)/2 is the semi-perimeter

In [10]:
```
# COMPLETE CELL BELOW

import math

class Triangle:
    def __init__(self, a, b, c):
        self.a = a
        self.b = b
        self.c = c

    def area(self):
        s = (self.a + self.b + self.c)/2
        area = math.sqrt(s*(s - a)*(s - b)*(s - c))
        return area

# test case
a = 3
b = 4
c = 5

init = Triangle(a, b, c)
area = init.area()

print ("The area of this triangle is {}".format(area))
```

```
The area of this triangle is 6.0
```

In [ ]:
```

```