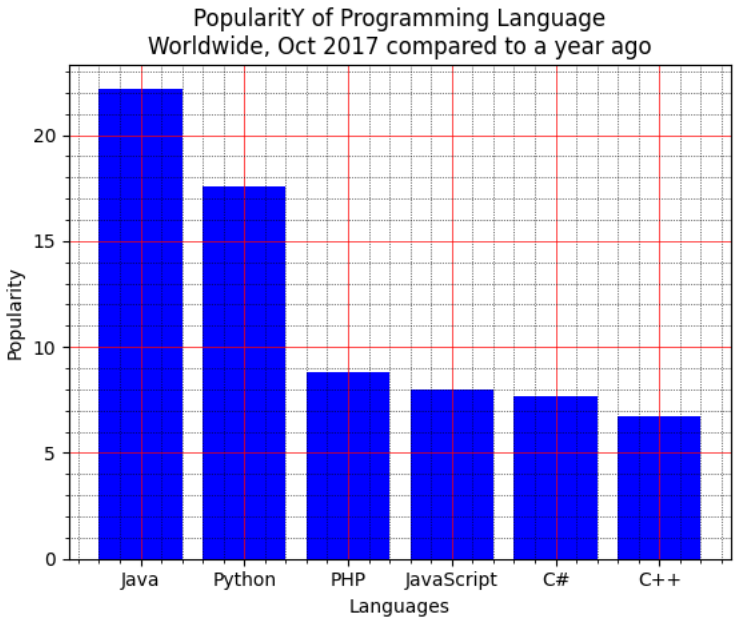
Write a Python programming to display a bar chart of the popularity of programming Languages.

Sample data:

Programming languages: Java, Python, PHP, JavaScript, C#, C++

Popularity: 22.2, 17.6, 8.8, 8, 7.7, 6.7

```
import matplotlib.pyplot as plt
x = ['Java', 'Python', 'PHP', 'JavaScript', 'C#', 'C++']
popularity = [22.2, 17.6, 8.8, 8, 7.7, 6.7]
x_pos = [i for i, _ in enumerate(x)]
plt.bar(x_pos, popularity, color='blue')
plt.xlabel("Languages")
plt.ylabel("Popularity")
plt.title("PopularitY of Programming Language\n" + "Worldwide, Oct 2017 compared to a year ago")
plt.xticks(x_pos, x)
# Turn on the grid
plt.minorticks_on()
plt.grid(which='major', linestyle='-', linewidth='0.5', color='red')
# Customize the minor grid
plt.grid(which='minor', linestyle=':', linewidth='0.5', color='black')
plt.show()
```

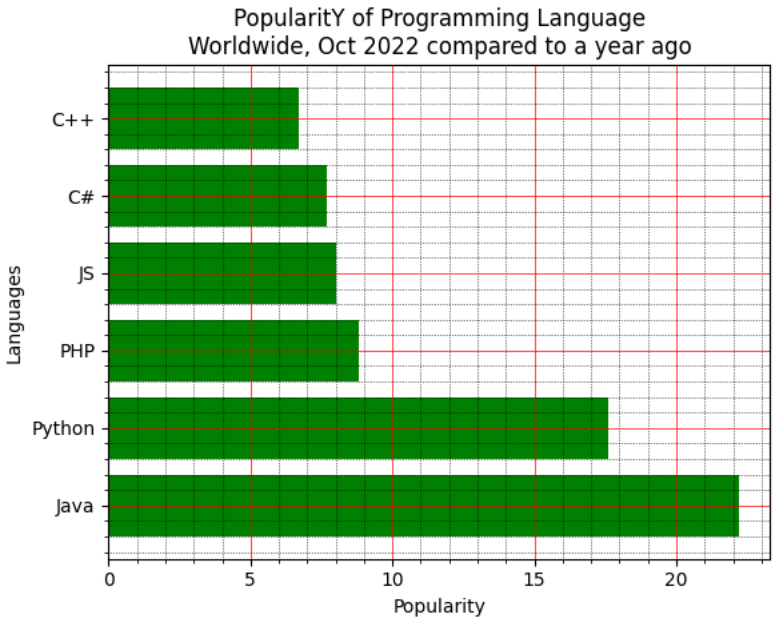


Write a Python programming to display a horizontal bar chart of the popularity of programming Languages.

Programming languages: Java, Python, PHP, JavaScript, C#, C++

Popularity: 22.2, 17.6, 8.8, 8, 7.7, 6.7

```
import matplotlib.pyplot as plt
x = ['Java', 'Python', 'PHP', 'JS', 'C#', 'C++']
popularity = [22.2, 17.6, 8.8, 8, 7.7, 6.7]
x_pos = [i for i, _ in enumerate(x)]
plt.barh(x_pos, popularity, color='green')
plt.xlabel("Popularity")
plt.ylabel("Languages")
plt.title("PopularitY of Programming Language\n" + "Worldwide, Oct 2022 compared to a year ago")
plt.yticks(x_pos, x)
# Turn on the grid
plt.minorticks_on()
plt.grid(which='major', linestyle='-', linewidth='0.5', color='red')
# Customize the minor grid
plt.grid(which='minor', linestyle=':', linewidth='0.5', color='black')
plt.show()
```



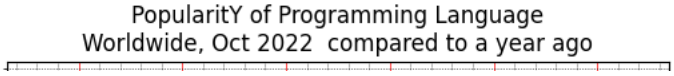
Write a Python programming to display a bar chart of the popularity of programming Languages.

Use different color for each bar.

Programming languages: Java, Python, PHP, JavaScript, C#, C++

Popularity: 22.2, 17.6, 8.8, 8, 7.7, 6.7

```
import matplotlib.pyplot as plt
x = ['Java', 'Python', 'PHP', 'JavaScript', 'C#', 'C++']
popularity = [22.2, 17.6, 8.8, 8, 7.7, 6.7]
x_pos = [i for i, _ in enumerate(x)]

plt.bar(x_pos, popularity, color=['red', 'black', 'green', 'blue', 'yellow', 'cyan'])

plt.xlabel("Languages")
plt.ylabel("Popularity")
plt.title("PopularitY of Programming Language\n" + "Worldwide, Oct 2022  compared to a year ago")
plt.xticks(x_pos, x)
# Turn on the grid
plt.minorticks_on()
plt.grid(which='major', linestyle='-', linewidth='0.5', color='red')
# Customize the minor grid
plt.grid(which='minor', linestyle=':', linewidth='0.5', color='black')
plt.show()
```

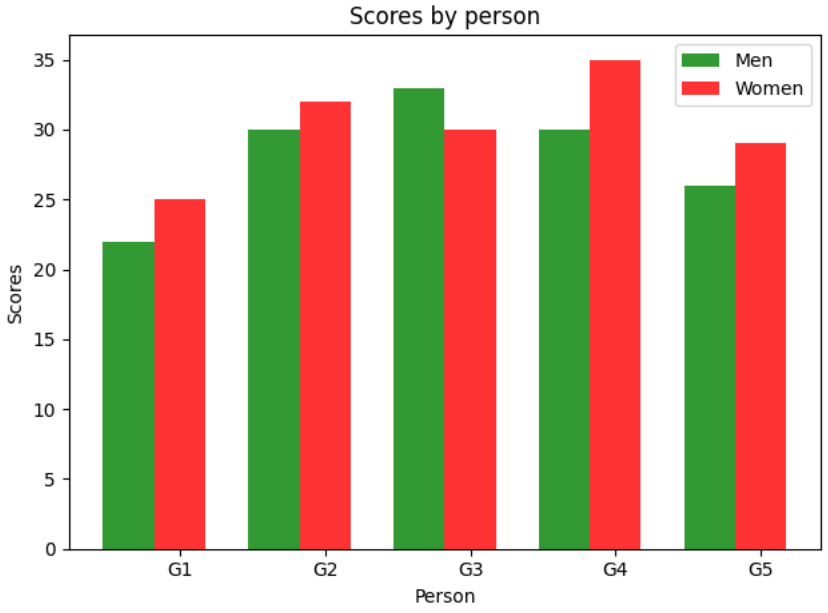


Write a Python program to create bar plot of scores by group and gender. Use multiple X values on the same chart for men and women.

Means (men) = (22, 30, 35, 35, 26)

Means (women) = (25, 32, 30, 35, 29)

```
import numpy as np
import matplotlib.pyplot as plt

# data to plot
n_groups = 5
men_means = (22, 30, 33, 30, 26)
women_means = (25, 32, 30, 35, 29)

# create plot
fig, ax = plt.subplots()
index = np.arange(n_groups)
bar_width = 0.35
opacity = 0.8

rects1 = plt.bar(index, men_means, bar_width,
alpha=opacity,
color='g',
label='Men')

rects2 = plt.bar(index + bar_width, women_means, bar_width,
alpha=opacity,
color='r',
label='Women')

plt.xlabel('Person')
plt.ylabel('Scores')
plt.title('Scores by person')
plt.xticks(index + bar_width, ('G1', 'G2', 'G3', 'G4', 'G5'))
plt.legend()

plt.tight_layout()
plt.show()
```



Write a Python program to create bar plot from a DataFrame.

a b c d e

2 4,8,5,7,6

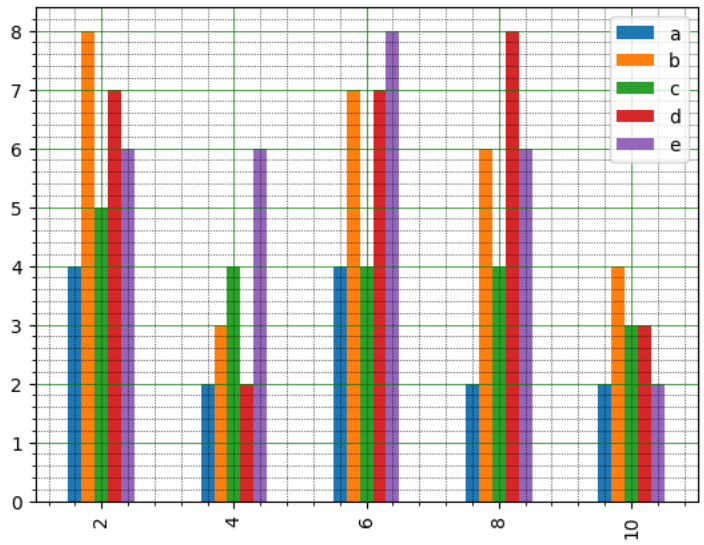
4 2,3,4,2,6

6 4,7,4,7,8

8 2,6,4,8,6

10 2,4,3,3,2

```
from pandas import DataFrame
import matplotlib.pyplot as plt
import numpy as np

a=np.array([[4,8,5,7,6],[2,3,4,2,6],[4,7,4,7,8],[2,6,4,8,6],[2,4,3,3,2]])
df=DataFrame(a, columns=['a','b','c','d','e'], index=[2,4,6,8,10])

df.plot(kind='bar')
# Turn on the grid
plt.minorticks_on()
plt.grid(which='major', linestyle='-', linewidth='0.5', color='green')
plt.grid(which='minor', linestyle=':', linewidth='0.5', color='black')

plt.show()
```



te a Python program to create a stacked bar plot with error bars.

Note: Use bottom to stack the women?s bars on top of the men?s bars.

Sample Data:

Means (men) = (22, 30, 35, 35, 26)

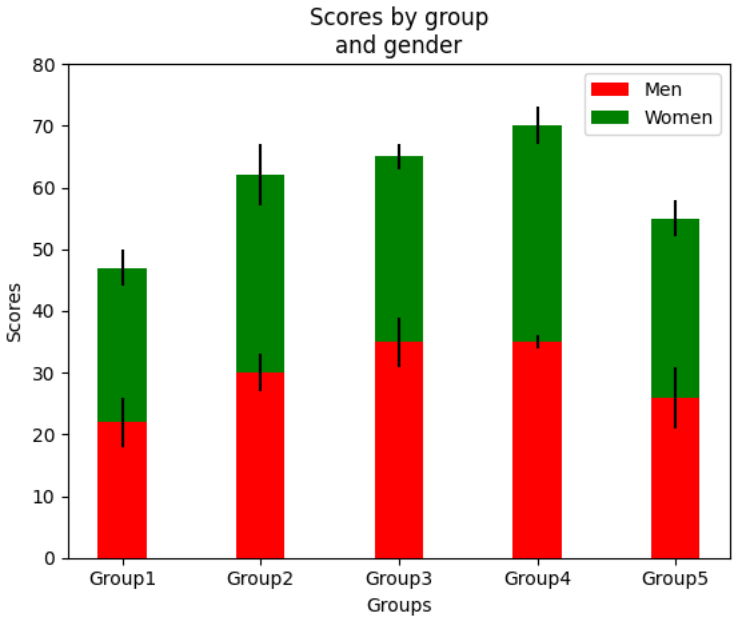
Means (women) = (25, 32, 30, 35, 29)

Men Standard deviation = (4, 3, 4, 1, 5)

Women Standard deviation = (3, 5, 2, 3, 3)

```
import numpy as np
import matplotlib.pyplot as plt

N = 5
menMeans = (22, 30, 35, 35, 26)
womenMeans = (25, 32, 30, 35, 29)
menStd = (4, 3, 4, 1, 5)
womenStd = (3, 5, 2, 3, 3)
# the x locations for the groups
ind = np.arange(N)
# the width of the bars
width = 0.35

p1 = plt.bar(ind, menMeans, width, yerr=menStd, color='red')
p2 = plt.bar(ind, womenMeans, width,
bottom=menMeans, yerr=womenStd, color='green')
```

```
plt.ylabel('Scores')
plt.xlabel('Groups')
plt.title('Scores by group\n' + 'and gender')
plt.xticks(ind, ('Group1', 'Group2', 'Group3', 'Group4', 'Group5'))
plt.yticks(np.arange(0, 81, 10))
plt.legend((p1[0], p2[0]), ('Men', 'Women'))

plt.show()
```



Write a Python program to create stack bar plot and add label to each section.

people = ('G1','G2','G3','G4','G5','G6','G7','G8')

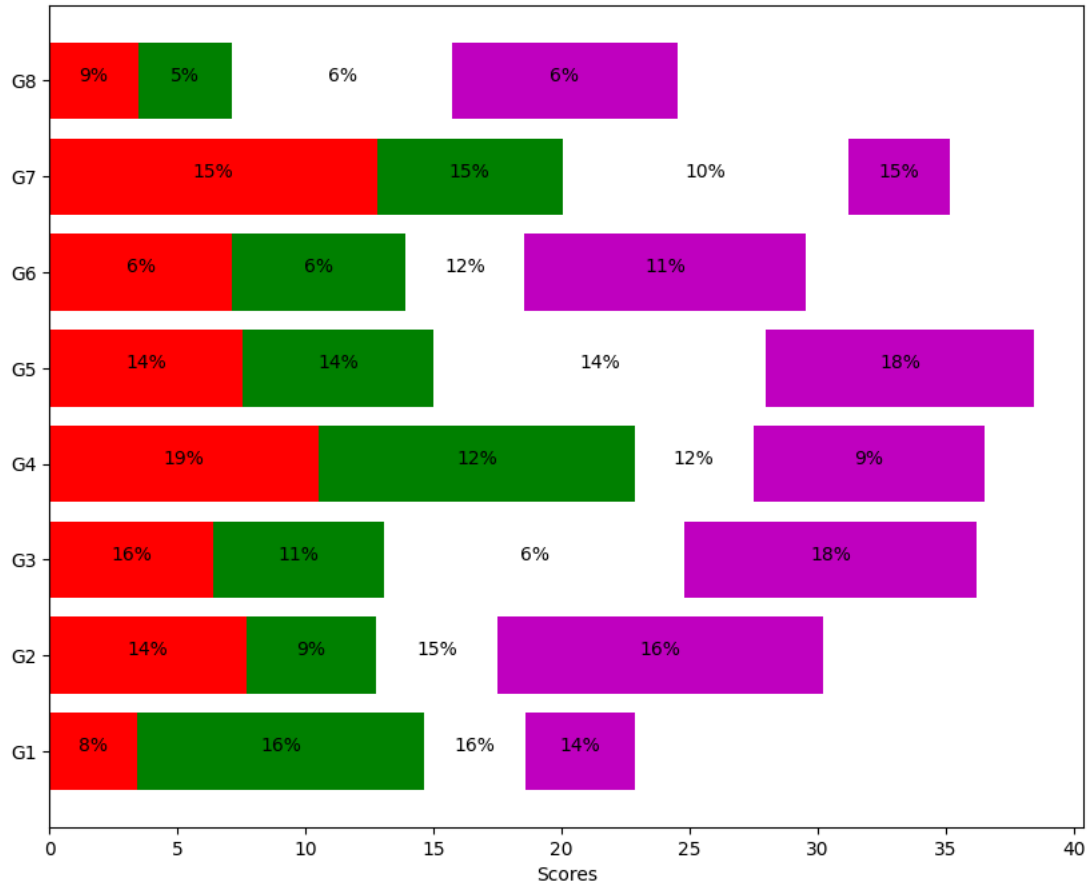
segments = 4

multi-dimensional data

data = [[3.40022085, 7.70632498, 6.4097905, 10.51648577, 7.5330039, 7.1123587, 12.77792868, 3.44773477], [11.24811149, 5.03778215, 6.65808464, 12.32220677, 7.45964195, 6.79685302, 7.24578743, 3.69371847], [3.94253354, 4.74763549, 11.73529246, 4.6465543, 12.9952182, 4.63832778, 11.16849999, 8.56883433], [4.24409799, 12.71746612, 11.3772169, 9.00514257, 10.47084185, 10.97567589, 3.98287652, 8.80552122]]

```
import numpy as np
import matplotlib.pyplot as plt

people = ('G1','G2','G3','G4','G5','G6','G7','G8')
segments = 4

# multi-dimensional data
data = [[  3.40022085,   7.70632498,   6.4097905,   10.51648577,   7.5330039,
    7.1123587,   12.77792868,   3.44773477],
 [ 11.24811149,   5.03778215,   6.65808464,  12.32220677,   7.45964195,
    6.79685302,   7.24578743,   3.69371847],
 [  3.94253354,   4.74763549,  11.73529246,   4.6465543,   12.9952182,
    4.63832778,  11.16849999,   8.56883433],
 [  4.24409799,  12.71746612,  11.3772169,    9.00514257,  10.47084185,
   10.97567589,   3.98287652,   8.80552122]]
percentages = (np.random.randint(5,20, (len(people), segments)))
y_pos = np.arange(len(people))

fig = plt.figure(figsize=(10,8))
ax = fig.add_subplot(111)

colors ='rgwm'
patch_handles = []
# left alignment of data starts at zero
```

```
left = np.zeros(len(people))
for i, d in enumerate(data):
    patch_handles.append(ax.barh(y_pos, d,
      color=colors[i%len(colors)], align='center',
      left=left))
    left += d

# search all of the bar segments and annotate
for j in range(len(patch_handles)):
    for i, patch in enumerate(patch_handles[j].get_children()):
        bl = patch.get_xy()
        x = 0.5*patch.get_width() + bl[0]
        y = 0.5*patch.get_height() + bl[1]
        ax.text(x,y, "%d%%" % (percentages[i,j]), ha='center')

ax.set_yticks(y_pos)
ax.set_yticklabels(people)
ax.set_xlabel('Scores')
plt.show()
```



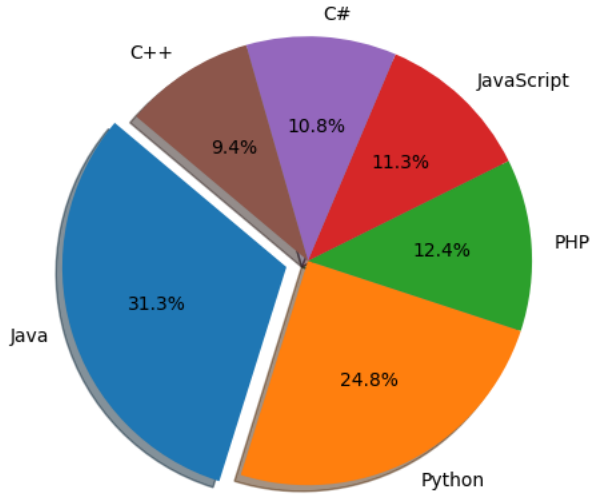
Write a Python programming to create a pie chart of the popularity of programming Languages.

Programming languages: Java, Python, PHP, JavaScript, C#, C++

Popularity: 22.2, 17.6, 8.8, 8, 7.7, 6.7

```
import matplotlib.pyplot as plt
# Data to plot
languages = 'Java', 'Python', 'PHP', 'JavaScript', 'C#', 'C++'
popurarity = [22.2, 17.6, 8.8, 8, 7.7, 6.7]
colors = ["#1f77b4", "#ff7f0e", "#2ca02c", "#d62728", "#9467bd", "#8c564b"]
# explode 1st slice
explode = (0.1, 0, 0, 0,0,0)
# Plot
plt.pie(popurarity, explode=explode, labels=languages, colors=colors,
autopct='%1.1f%%', shadow=True, startangle=140)

plt.axis('equal')
```

```
plt.show()
```

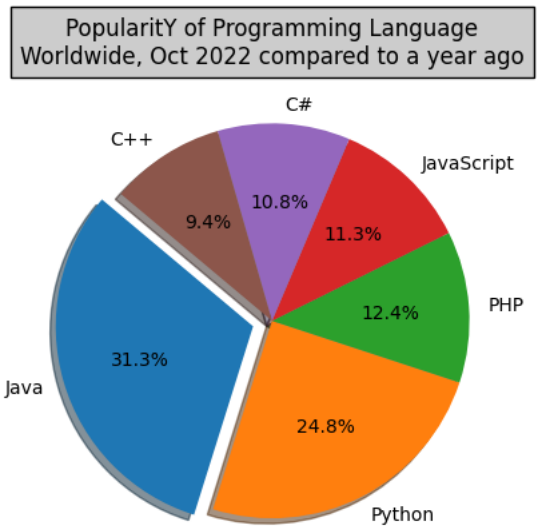


Write a Python programming to create a pie chart with a title of the popularity of programming Languages.

Programming languages: Java, Python, PHP, JavaScript, C#, C++

Popularity: 22.2, 17.6, 8.8, 8, 7.7, 6.7

```
import matplotlib.pyplot as plt
# Plot data
languages = 'Java', 'Python', 'PHP', 'JavaScript', 'C#', 'C++'
popuratity = [22.2, 17.6, 8.8, 8, 7.7, 6.7]
#colors = ['red', 'gold', 'yellowgreen', 'blue', 'lightcoral', 'lightskyblue']
colors = ["#1f77b4", "#ff7f0e", "#2ca02c", "#d62728", "#9467bd", "#8c564b"]
# explode 1st slice
explode = (0.1, 0, 0, 0, 0, 0)
# Plot
plt.pie(popuratity, explode=explode, labels=languages, colors=colors,
autopct='%1.1f%%', shadow=True, startangle=140)
plt.title("PopularitY of Programming Language\n" + "Worldwide, Oct 2022 compared to a year ago", bbox={'facecolor':'0.8', 'pad':5})
plt.show()
```



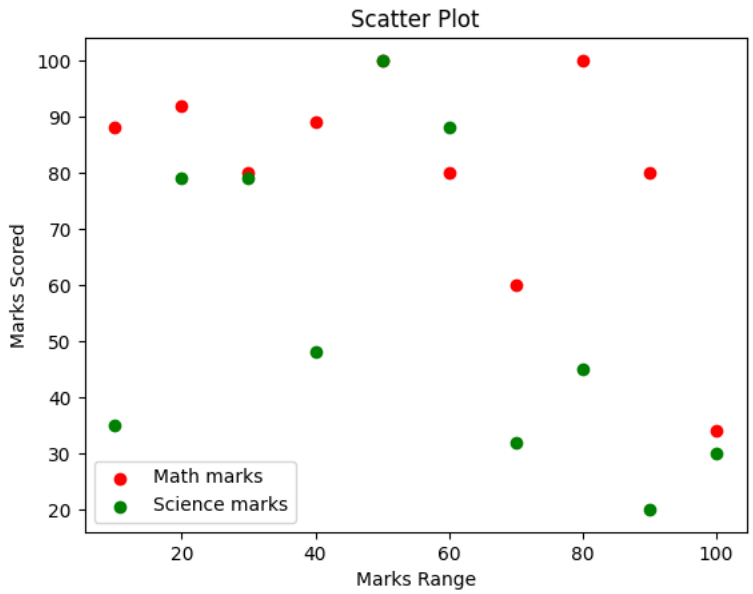
Write a Python program to draw a scatter plot comparing two subject marks of Mathematics and Science. Use marks of 10 students. Test Data:

math_marks = [88, 92, 80, 89, 100, 80, 60, 100, 80, 34]

science_marks = [35, 79, 79, 48, 100, 88, 32, 45, 20, 30]

marks_range = [10, 20, 30, 40, 50, 60, 70, 80, 90, 100]

```
import matplotlib.pyplot as plt
import pandas as pd
math_marks = [88, 92, 80, 89, 100, 80, 60, 100, 80, 34]
science_marks = [35, 79, 79, 48, 100, 88, 32, 45, 20, 30]
marks_range = [10, 20, 30, 40, 50, 60, 70, 80, 90, 100]
plt.scatter(marks_range, math_marks, label='Math marks', color='r')
plt.scatter(marks_range, science_marks, label='Science marks', color='g')
plt.title('Scatter Plot')
plt.xlabel('Marks Range')
plt.ylabel('Marks Scored')
plt.legend()
plt.show()
```



Write a Python class to convert an integer to a Roman numeral.

```
class py_solution:
    def int_to_Roman(self, num):
        val = [
            1000, 900, 500, 400,
            100, 90, 50, 40,
            10, 9, 5, 4,
            1
            ]
        syb = [
            "M", "CM", "D", "CD",
            "C", "XC", "L", "XL",
            "X", "IX", "V", "IV",
            "I"
            ]
        roman_num = ''
        i = 0
        while  num > 0:
            for _ in range(num // val[i]):
                roman_num += syb[i]
                num -= val[i]
            i += 1
        return roman_num


print(py_solution().int_to_Roman(1))
print(py_solution().int_to_Roman(4000))
```

```
I
MMMM
```

Write a Python class to check the validity of a string of parentheses, '(', ')', '{', '}', '[' and ']. These brackets must be closed in the correct order, for example "()" and "()[]{}" are valid but "[)", "({[)]" and "{{{" are invalid.

```
class py_solution:
   def is_valid_parenthese(self, str1):
        stack, pchar = [], {"(": ")", "{": "}", "[": "]"}
        for parenthese in str1:
            if parenthese in pchar:
                stack.append(parenthese)
            elif len(stack) == 0 or pchar[stack.pop()] != parenthese:
                return False
        return len(stack) == 0

print(py_solution().is_valid_parenthese("(){}[]"))
print(py_solution().is_valid_parenthese("()[{)}"))
print(py_solution().is_valid_parenthese("()"))
```

```
True
False
True
```

Write a Python class Employee with attributes like emp_id, emp_name, emp_salary, and emp_department and methods like calculate_emp_salary, emp_assign_department, and print_employee_details.

Sample Employee Data:

"ADAMS", "E7876", 50000, "ACCOUNTING"

"JONES", "E7499", 45000, "RESEARCH"

"MARTIN", "E7900", 50000, "SALES"

"SMITH", "E7698", 55000, "OPERATIONS"

Use 'assign_department' method to change the department of an employee.

Use 'print_employee_details' method to print the details of an employee.

Use 'calculate_emp_salary' method takes two arguments: salary and hours_worked, which is the number of hours worked by the employee. If the number of hours worked is more than 50, the method computes overtime and adds it to the salary.

Overtime is calculated as following formula:

overtime = hours_worked – 50

Overtime amount = (overtime * (salary / 50))

```
class Employee:
    def __init__(self, name, emp_id, salary, department):
        self.name = name
        self.id = emp_id
        self.salary = salary
        self.department = department

    def calculate_salary(self, salary, hours_worked):
        overtime = 0
        if hours_worked > 50:
            overtime = hours_worked - 50
        self.salary = self.salary + (overtime * (self.salary / 50))

    def assign_department(self, emp_department):
        self.department = emp_department

    def print_employee_details(self):
        print("\nName: ", self.name)
        print("ID: ", self.id)
        print("Salary: ", self.salary)
        print("Department: ", self.department)
        print("----------------------")


employee1 = Employee("ADAMS", "E7876", 50000, "ACCOUNTING")
employee2 = Employee("JONES", "E7499", 45000, "RESEARCH")
employee3 = Employee("MARTIN", "E7900", 50000, "SALES")
employee4 = Employee("SMITH", "E7698", 55000, "OPERATIONS")
```

```
print("Original Employee Details:")
employee1.print_employee_details()
employee2.print_employee_details()
employee3.print_employee_details()
employee4.print_employee_details()

# Change the departments of employee1 and employee4
employee1.assign_department("OPERATIONS")
employee4.assign_department("SALES")

# Now calculate the overtime of the employees who are eligible:
employee2.calculate_salary(45000, 52)
employee4.calculate_salary(45000, 60)

print("Updated Employee Details:")
employee1.print_employee_details()
employee2.print_employee_details()
employee3.print_employee_details()
employee4.print_employee_details()
```

```
Original Employee Details:

Name:  ADAMS
ID:  E7876
Salary:  50000
Department:  ACCOUNTING
----------------------

Name:  JONES
ID:  E7499
Salary:  45000
Department:  RESEARCH
----------------------

Name:  MARTIN
ID:  E7900
Salary:  50000
Department:  SALES
----------------------

Name:  SMITH
ID:  E7698
Salary:  55000
Department:  OPERATIONS
----------------------
Updated Employee Details:

Name:  ADAMS
ID:  E7876
Salary:  50000
Department:  OPERATIONS
----------------------

Name:  JONES
ID:  E7499
Salary:  46800.0
Department:  RESEARCH
----------------------

Name:  MARTIN
ID:  E7900
Salary:  50000
Department:  SALES
----------------------

Name:  SMITH
ID:  E7698
Salary:  66000.0
Department:  SALES
----------------------
```

Write a Python class Restaurant with attributes like menu_items, book_table, and customer_orders, and methods like add_item_to_menu, book_tables, and customer_order.

Perform the following tasks now:

Now add items to the menu.

Make table reservations.

Take customer orders.

Print the menu.

Print table reservations.

Print customer orders.

Note: Use dictionaries and lists to store the data.

```
class Restaurant:
    def __init__(self):
        self.menu_items = {}
        self.book_table = []
        self.customer_orders = []

    def add_item_to_menu(self, item, price):
        self.menu_items[item] = price

    def book_tables(self, table_number):
        self.book_table.append(table_number)

    def customer_order(self, table_number, order):
        order_details = {'table_number': table_number, 'order': order}
        self.customer_orders.append(order_details)

    def print_menu_items(self):
        for item, price in self.menu_items.items():
            print("{}: {}".format(item, price))

    def print_table_reservations(self):
        for table in self.book_table:
            print("Table {}".format(table))

    def print_customer_orders(self):
        for order in self.customer_orders:
            print("Table {}: {}".format(order['table_number'], order['order']))

restaurant = Restaurant()

# Add items
restaurant.add_item_to_menu("Cheeseburger", 9.99)
restaurant.add_item_to_menu("Caesar Salad", 8)
restaurant.add_item_to_menu("Grilled Salmon", 19.99)
restaurant.add_item_to_menu("French Fries", 3.99)
restaurant.add_item_to_menu("Fish & Chips:", 15)
# Book table
restaurant.book_tables(1)
restaurant.book_tables(2)
restaurant.book_tables(3)
# Order items
restaurant.customer_order(1, "Cheeseburger")
restaurant.customer_order(1, "Grilled Salmon")
restaurant.customer_order(2, "Fish & Chips")
restaurant.customer_order(2, "Grilled Salmon")

print("\nPopular dishes in the restaurant along with their prices:")
restaurant.print_menu_items()
print("\nTable reserved in the Restaurant:")
restaurant.print_table_reservations()
print("\nPrint customer orders:")
restaurant.print_customer_orders()
```

```
Popular dishes in the restaurant along with their prices:
Cheeseburger: 9.99
Caesar Salad: 8
Grilled Salmon: 19.99
French Fries: 3.99
Fish & Chips:: 15

Table reserved in the Restaurant:
Table 1
Table 2
Table 3

Print customer orders:
```

```
Table 1: Cheeseburger
Table 1: Grilled Salmon
Table 2: Fish & Chips
Table 2: Grilled Salmon
```

Write a Python class BankAccount with attributes like account_number, balance, date_of_opening and customer_name, and methods like deposit, withdraw, and check_balance.

```
class BankAccount:
    def __init__(self, account_number, date_of_opening, balance, customer_name):
        self.account_number = account_number
        self.date_of_opening  = date_of_opening
        self.balance = balance
        self.customer_name = customer_name

    def deposit(self, amount):
        self.balance += amount
        print(f"${amount} has been deposited in your account.")

    def withdraw(self, amount):
        if amount > self.balance:
            print("Insufficient balance.")
        else:
            self.balance -= amount
            print(f"${amount} has been withdrawn from your account.")

    def check_balance(self):
        print(f"Current balance is ${self.balance}.")

    def print_customer_details(self):
        print("Name:", self.customer_name)
        print("Account Number:", self.account_number)
        print("Date of opening:", self.date_of_opening)
        print(f"Balance: ${self.balance}\n")

# Input customer details
ac_no_1 = BankAccount(2345, "01-01-2011", 1000, "Toninho Takeo")
ac_no_2 = BankAccount(1234, "11-03-2011", 2000, "Astrid Rugile")
ac_no_3 = BankAccount(2312, "12-01-2009", 3000, "Orli Kerenza")
ac_no_4 = BankAccount(1395, "01-01-2011", 3000, "Luciana Chika")
ac_no_5 = BankAccount(6345, "01-05-2011", 4000, "Toninho Takeo")

print("Customer Details:")
ac_no_1.print_customer_details()
ac_no_2.print_customer_details()
ac_no_3.print_customer_details()
ac_no_4.print_customer_details()
ac_no_5.print_customer_details()

print("============================")
ac_no_4.print_customer_details()
# Current balance is $3000.
# $1000 has been deposited in your account.
ac_no_4.deposit(1000)
ac_no_4.check_balance()
# Your current balance $4000.
# You want to withdraw $5000
ac_no_4.withdraw(5000)
# Output:
# Insufficient balance.
#The customer withdraw $3400.
ac_no_4.withdraw(3400)
ac_no_4.check_balance()
```

```
Customer Details:
Name: Toninho Takeo
Account Number: 2345
Date of opening: 01-01-2011
Balance: $1000

Name: Astrid Rugile
Account Number: 1234
Date of opening: 11-03-2011
Balance: $2000
```

```
Name: Orli Kerenza
Account Number: 2312
Date of opening: 12-01-2009
Balance: $3000

Name: Luciana Chika
Account Number: 1395
Date of opening: 01-01-2011
Balance: $3000

Name: Toninho Takeo
Account Number: 6345
Date of opening: 01-05-2011
Balance: $4000

============================
Name: Luciana Chika
Account Number: 1395
Date of opening: 01-01-2011
Balance: $3000

$1000 has been deposited in your account.
Current balance is $4000.
Insufficient balance.
$3400 has been withdrawn from your account.
Current balance is $600.
```

Write a Python class Inventory with attributes like item_id, item_name, stock_count, and price, and methods like add_item, update_item, and check_item_details.

Use a dictionary to store the item details, where the key is the item_id and the value is a dictionary containing the item_name, stock_count, and price

```
class Inventory:
    def __init__(self):
        self.inventory = {}
    def add_item(self, item_id, item_name, stock_count, price):
        self.inventory[item_id] = {"item_name": item_name, "stock_count": stock_count, "price": price}

    def update_item(self, item_id, stock_count, price):
        if item_id in self.inventory:
            self.inventory[item_id]["stock_count"] = stock_count
            self.inventory[item_id]["price"] = price
        else:
            print("Item not found in inventory.")

    def check_item_details(self, item_id):
        if item_id in self.inventory:
            item = self.inventory[item_id]
            return f"Product Name: {item['item_name']}, Stock Count: {item['stock_count']}, Price: {item['price']}"
        else:
            return "Item not found in inventory."

inventory = Inventory()

inventory.add_item("I001", "Laptop", 100, 500.00)
inventory.add_item("I002", "Mobile", 110, 450.00)
inventory.add_item("I003", "Desktop", 120, 500.00)
inventory.add_item("I004", "Tablet", 90, 550.00)
print("Item Details:")
print(inventory.check_item_details("I001"))
print(inventory.check_item_details("I002"))
print(inventory.check_item_details("I003"))
print(inventory.check_item_details("I004"))
print("\nUpdate the price of item code - 'I001':")
inventory.update_item("I001", 100, 505.00)
print(inventory.check_item_details("I001"))
print("\nUpdate the stock of item code - 'I003':")
inventory.update_item("I003", 115, 500.00)
print(inventory.check_item_details("I003"))
```

```
Item Details:
Product Name: Laptop, Stock Count: 100, Price: 500.0
Product Name: Mobile, Stock Count: 110, Price: 450.0
Product Name: Desktop, Stock Count: 120, Price: 500.0
Product Name: Tablet, Stock Count: 90, Price: 550.0
```

```
Update the price of item code - 'I001':
Product Name: Laptop, Stock Count: 100, Price: 505.0

Update the stock of item code - 'I003':
Product Name: Desktop, Stock Count: 115, Price: 500.0
```

Write a Python script to sort (ascending and descending) a dictionary by value

```
import operator
d = {1: 2, 3: 4, 4: 3, 2: 1, 0: 0}
print('Original dictionary : ',d)
sorted_d = sorted(d.items(), key=operator.itemgetter(1))
print('Dictionary in ascending order by value : ',sorted_d)
sorted_d = dict( sorted(d.items(), key=operator.itemgetter(1),reverse=True))
print('Dictionary in descending order by value : ',sorted_d)
```

```
Original dictionary :  {1: 2, 3: 4, 4: 3, 2: 1, 0: 0}
Dictionary in ascending order by value :  [(0, 0), (2, 1), (1, 2), (4, 3), (3, 4)]
Dictionary in descending order by value :  {3: 4, 4: 3, 1: 2, 2: 1, 0: 0}
```

Write a Python program that calculates the area of a circle based on the radius entered by the user.

Write a Python program that accepts the user's first and last name and prints them in reverse order with a space between them.

```
fname = input("Input your First Name : ")
lname = input("Input your Last Name : ")
print ("Hello  " + lname + " " + fname)
```

Write a Python program that accepts a sequence of comma-separated numbers from the user and generates a list and a tuple of those numbers.

Sample data: 3, 5, 7, 23

```
values = input("Input some comma seprated numbers : ")
list = values.split(",")
tuple = tuple(list)
print('List : ',list)
print('Tuple : ',tuple)
```

```
Input some comma seprated numbers : 2 3 4 5 8 1 2 3 4
List :  ['2 3 4 5 8 1 2 3 4 ']
Tuple :  ('2 3 4 5 8 1 2 3 4 ',)
```

Write a Python program to display the first and last colors from the following list.

color_list = ["Red","Green","White" ,"Black"]

Double-click (or enter) to edit

```
color_list = ["Red","Green","White" ,"Black"]
print( "%s %s"%(color_list[0],color_list[-1]))
```

```
Red Black
```

Write a Python program that accepts an integer (n) and computes the value of n+nn+nnn.

Write a Python program to create two empty classes, Student and Marks. Now create some instances and check whether they are instances of the said classes or not. Also, check whether the said classes are subclasses of the built-in object class or not.

```
class Student:
    pass
class Marks:
    pass
```

```
student1 = Student()
marks1 = Marks()
print(isinstance(student1, Student))
print(isinstance(marks1, Student))
print(isinstance(marks1, Marks))
print(isinstance(student1, Marks))
print("\nCheck whether the said classes are subclasses of the built-in object class or not.")
print(issubclass(Student, object))
print(issubclass(Marks, object))
```

Write a Python program to find the first appearance of the substrings 'not' and 'poor' in a given string. If 'not' follows 'poor', replace the whole 'not'...'poor' substring with 'good'. Return the resulting string.

```
def not_poor(str1):
  snot = str1.find('not')
  spoor = str1.find('poor')


  if spoor > snot and snot>0 and spoor>0:
    str1 = str1.replace(str1[snot:(spoor+4)], 'good')
    return str1
  else:
    return str1
print(not_poor('The lyrics is not that poor!'))
print(not_poor('The lyrics is poor!'))
```

```
 The lyrics is good!
 The lyrics is poor!
```

Write a Python program that accepts a comma-separated sequence of words as input and prints the distinct words in sorted form (alphanumerically).

```
items = input("Input comma separated sequence of words")
words = [word for word in items.split(",")]
print(",".join(sorted(list(set(words)))))
```

```
Input comma separated sequence of wordshello, i, we you
 i, we you,hello
```

Write a Python program to create a Caesar encryption.

In cryptography, a Caesar cipher, also known as Caesar's cipher, the shift cipher, Caesar's code or Caesar shift, is one of the simplest and most widely known encryption techniques. It is a type of substitution cipher in which each letter in the plaintext is replaced by a letter some fixed number of positions down the alphabet. For example, with a left shift of 3, D would be replaced by A, E would become B, and so on. The method is named after Julius Caesar, who used it in his private correspondence.

```
def caesar_encrypt(realText, step):
    outText = []
    cryptText = []

    uppercase = ['A', 'B', 'C', 'D', 'E', 'F', 'G', 'H', 'I', 'J', 'K', 'L', 'M', 'N', 'O', 'P', 'Q', 'R', 'S', 'T', 'U', 'V', 'W', 'X', 'Y',
    lowercase = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j', 'k', 'l', 'm', 'n', 'o', 'p', 'q', 'r', 's', 't', 'u', 'v', 'w', 'x', 'y',

    for eachLetter in realText:
        if eachLetter in uppercase:
            index = uppercase.index(eachLetter)
            crypting = (index + step) % 26
            cryptText.append(crypting)
            newLetter = uppercase[crypting]
            outText.append(newLetter)
        elif eachLetter in lowercase:
            index = lowercase.index(eachLetter)
            crypting = (index + step) % 26
            cryptText.append(crypting)
            newLetter = lowercase[crypting]
            outText.append(newLetter)
    return outText
```

```
code = caesar_encrypt('abc', 2)
print()
print(code)
print()
```

```
['c', 'd', 'e']
```

Write a Python program to count repeated characters in a string.

```
import collections
str1 = 'thequickbrownfoxjumpsoverthelazydog'
d = collections.defaultdict(int)
for c in str1:
    d[c] += 1

for c in sorted(d, key=d.get, reverse=True):
  if d[c] > 1:
      print('%s %d' % (c, d[c]))
```

```
o 4
e 3
t 2
h 2
u 2
r 2
```

Write a Python program to convert a given string into a list of words.

```
str1 = "The quick brown fox jumps over the lazy dog."
print(str1.split(' '))
str1 = "The-quick-brown-fox-jumps-over-the-lazy-dog."
print(str1.split('-'))
```

```
['The', 'quick', 'brown', 'fox', 'jumps', 'over', 'the', 'lazy', 'dog.']
['The', 'quick', 'brown', 'fox', 'jumps', 'over', 'the', 'lazy', 'dog.']
```

Write a Python program to find all the common characters in lexicographical order from two given lower case strings. If there are no similar letters print "No common characters".

```
from collections import Counter
def common_chars(str1,str2):
    d1 = Counter(str1)
    d2 = Counter(str2)
    common_dict = d1 & d2
    if len(common_dict) == 0:
        return "No common characters."

    # list of common elements
    common_chars = list(common_dict.elements())
    common_chars = sorted(common_chars)

    return ''.join(common_chars)

str1 = 'Python'
str2 = 'PHP'
print("Two strings: "+str1+' : '+str2)
print(common_chars(str1, str2))
str1 = 'Java'
str2 = 'PHP'
print("Two strings: "+str1+' : '+str2)
print(common_chars(str1, str2))
```

```
Two strings: Python : PHP
P
Two strings: Java : PHP
No common characters.
```

Write a Python program to check whether any word in a given string contains duplicate characters or not. Return True or False.

```
def duplicate_letters(text):
  word_list = text.split()
  for word in word_list:
    if len(word) > len(set(word)):
      return False
  return True
text = "Filter out the factorials of the said list."
print("Original text:")
print(text)
print("Check whether any word in the said sting contains duplicate characrters or not!")
print(duplicate_letters(text))
text = "Python Exercise."
print("\nOriginal text:")
print(text)
print("Check whether any word in the said sting contains duplicate characrters or not!")
print(duplicate_letters(text))
text = "The wait is over."
print("\nOriginal text:")
print(text)
print("Check whether any word in the said sting contains duplicate characrters or not!")
print(duplicate_letters(text))
```

```
Original text:
Filter out the factorials of the said list.
Check whether any word in the said sting contains duplicate characrters or not!
False

Original text:
Python Exercise.
Check whether any word in the said sting contains duplicate characrters or not!
False

Original text:
The wait is over.
Check whether any word in the said sting contains duplicate characrters or not!
True
```

Write a Python program to replace each character of a word of length five and more with a hash character (#).

Sample Output: Original string: Count the lowercase letters in the said list of words:

Replace words (length five or more) with hash characters in the said string:

the ######### ######## in the said list of

Original string: Python - Remove punctuations from a string:

Replace words (length five or more) with hash characters in the said string:

- ###### ############ from a

```
def test(text):
  for i in text.split():
    if len(i) >= 5:
      text = text.replace(i, "#" * len(i))
  return text

text ="Count the lowercase letters in the said list of words:"
print("Original string:", text)
print("Replace words (length five or more) with hash characters in the said string:")
print(test(text))
text = "Python - Remove punctuations from a string:"
print("\nOriginal string:", text)
print("Replace words (length five or more) with hash characters in the said string:")
print(test(text))
```

```
Original string: Count the lowercase letters in the said list of words:
Replace words (length five or more) with hash characters in the said string:
##### the ######### ######## in the said list of ######

Original string: Python - Remove punctuations from a string:
Replace words (length five or more) with hash characters in the said string:
###### - ###### ############ from a #######
```

Write a Python program to find out if a given array of integers contains any duplicate elements. Return true if any value appears at least twice in the array, and return false if every element is distinct

```
def test_duplicate(array_nums):
    nums_set = set(array_nums)
    return len(array_nums) != len(nums_set)
print(test_duplicate([1,2,3,4,5]))
print(test_duplicate([1,2,3,4, 4]))
print(test_duplicate([1,1,2,2,3,3,4,4,5]))
```

```
False
True
True
```

Write a Python program to check whether it follows the sequence given in the patterns array.

Pattern example: For color1 = ["red", "green", "green"] and patterns = ["a", "b", "b"]

the output should be samePatterns(color1, patterns) = true;

For color2 = ["red", "green", "greenn"] and patterns = ["a", "b", "b"]

the output should be samePatterns (strings, color2) = false.

```
def is_samePatterns(colors, patterns):
    if len(colors) != len(patterns):
        return False
    sdict = {}
    pset = set()
    sset = set()
    for i in range(len(patterns)):
        pset.add(patterns[i])
        sset.add(colors[i])
        if patterns[i] not in sdict.keys():
            sdict[patterns[i]] = []

        keys = sdict[patterns[i]]
        keys.append(colors[i])
        sdict[patterns[i]] = keys

    if len(pset) != len(sset):
        return False

    for values in sdict.values():

        for i in range(len(values) - 1):
            if values[i] != values[i+1]:
                return False

    return True

print(is_samePatterns(["red",
 "green",
 "green"], ["a",
 "b",
 "b"]))

print(is_samePatterns(["red",
 "green",
 "greenn"], ["a",
 "b",
 "b"]))
```

```
True
False
```

Write a Python program that removes all duplicate elements from an array and returns a new array.

```
import array as arr
def test(nums):
```

```
    return sorted(set(nums),key=nums.index)

array_num = arr.array('i', [1, 3, 5, 1, 3, 7, 9])
print("Original array:")
for i in range(len(array_num)):
    print(array_num[i], end=' ')
print("\nAfter removing duplicate elements from the said array:")
result = arr.array('i', test(array_num))
for i in range(len(result)):
    print(result[i], end=' ')
array_num = arr.array('i', [2, 4, 2, 6, 4, 8])
print("\nOriginal array:")
for i in range(len(array_num)):
    print(array_num[i], end=' ')
print("\nAfter removing duplicate elements from the said array:")
result = arr.array('i', test(array_num))
for i in range(len(result)):
    print(result[i], end=' ')
```

```
Original array:
1 3 5 1 3 7 9
After removing duplicate elements from the said array:
1 3 5 7 9
Original array:
2 4 2 6 4 8
After removing duplicate elements from the said array:
2 4 6 8
```

Write a Python program to find the missing number in a given array of numbers between 10 and 20.

```
import array as arr
def test(nums):
    return sum(range(10, 21)) - sum(list(nums))

array_num = arr.array('i', [10, 11, 12, 13, 14, 16, 17, 18, 19, 20])
print("Original array:")
for i in range(len(array_num)):
    print(array_num[i], end=' ')
print("\nMissing number in the said array (10-20): ",test(array_num))

array_num = arr.array('i', [10, 11, 12, 13, 14, 15, 16, 17, 18, 19])
print("\nOriginal array:")
for i in range(len(array_num)):
    print(array_num[i], end=' ')
print("\nMissing number in the said array (10-20): ",test(array_num))
```

```
Original array:
10 11 12 13 14 16 17 18 19 20
Missing number in the said array (10-20):  15

Original array:
10 11 12 13 14 15 16 17 18 19
Missing number in the said array (10-20):  20
```

Write a Python function that accepts a string and counts the number of upper and lower case letters.

```
def string_test(s):
    d={"UPPER_CASE":0, "LOWER_CASE":0}
    for c in s:
        if c.isupper():
           d["UPPER_CASE"]+=1
        elif c.islower():
           d["LOWER_CASE"]+=1
        else:
           pass
    print ("Original String : ", s)
    print ("No. of Upper case characters : ", d["UPPER_CASE"])
    print ("No. of Lower case Characters : ", d["LOWER_CASE"])

string_test('The quick Brown Fox')
```

```
Original String :  The quick Brown Fox
No. of Upper case characters :  3
No. of Lower case Characters :  13
```

Write a Python function to check whether a number is "Perfect" or not

```
def perfect_number(n):
    sum = 0
    for x in range(1, n):
        if n % x == 0:
            sum += x
    return sum == n
print(perfect_number(6))
```

```
True
```

Write a Python function that prints out the first n rows of Pascal's triangle.

```
def pascal_triangle(n):
   trow = [1]
   y = [0]
   for x in range(max(n,0)):
      print(trow)
      trow=[l+r for l,r in zip(trow+y, y+trow)]
   return n>=1
pascal_triangle(6)
```

```
[1]
[1, 1]
[1, 2, 1]
[1, 3, 3, 1]
[1, 4, 6, 4, 1]
[1, 5, 10, 10, 5, 1]
True
```

Write a Python function to create and print a list where the values are the squares of numbers between 1 and 30 (both included)

```
def printValues():
    l = list()
    for i in range(1,21):
        l.append(i**2)
    print(l)

printValues()
```

```
[1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225, 256, 289, 324, 361, 400]
```

Write a Python program to create a lambda function that adds 15 to a given number passed in as an argument, also create a lambda function that multiplies argument x with argument y and prints the result.

```
r = lambda a : a + 15
print(r(10))
r = lambda x, y : x * y
print(r(12, 4))
```

```
25
48
```

Write a Python program to sort a list of tuples using Lambda.

```
subject_marks = [('English', 88), ('Science', 90), ('Maths', 97), ('Social sciences', 82)]
print("Original list of tuples:")
print(subject_marks)
subject_marks.sort(key = lambda x: x[1])
print("\nSorting the List of Tuples:")
```

```
print(subject_marks)
```

```
Original list of tuples:
[('English', 88), ('Science', 90), ('Maths', 97), ('Social sciences', 82)]

Sorting the List of Tuples:
[('Social sciences', 82), ('English', 88), ('Science', 90), ('Maths', 97)]
```

Write a Python program to check whether a given string is a number or not using Lambda.

```
is_num = lambda q: q.replace('.','',1).isdigit()
print(is_num('26587'))
print(is_num('4.2365'))
print(is_num('-12547'))
print(is_num('00'))
print(is_num('A001'))
print(is_num('001'))
print("\nPrint checking numbers:")
is_num1 = lambda r: is_num(r[1:]) if r[0]=='-' else is_num(r)
print(is_num1('-16.4'))
print(is_num1('-24587.11'))
```

```
True
True
False
True
False
True

Print checking numbers:
True
True
```

Write a Python program to filter a given list to determine if the values in the list have a length of 6 using Lambda.

```
weekdays = ['Monday', 'Tuesday', 'Wednesday', 'Thursday', 'Friday', 'Saturday', 'Sunday']
days = filter(lambda day: day if len(day)==6 else '', weekdays)
for d in days:
  print(d)
```

```
Monday
Friday
Sunday
```

Write a Python program to find the second lowest total marks of any student(s) from the given names and marks of each student using lists and lambda. Input the number of students, the names and grades of each student.

```
students = []
sec_name = []
second_low = 0
n = int(input("Input number of students: "))
for _ in range(n):
   s_name = input("Name: ")
   score = float(input("Grade: "))
   students.append([s_name,score])
print("\nNames and Grades of all students:")
print(students)
order =sorted(students, key = lambda x: int(x[1]))
for i in range(n):
   if order[i][1] != order[0][1]:
       second_low = order[i][1]
       break
print("\nSecond lowest grade: ",second_low)
sec_student_name = [x[0] for x in order if x[1] == second_low]
sec_student_name.sort()
print("\nNames:")
for s_name in sec_student_name:
   print(s_name)
```

```
Input number of students: 05
Name: nikhil
Grade: 50
Name: arun
Grade: 70
Name: bhushan
Grade: 78
Name: gopal
Grade: 67
Name: mukesh
Grade: 76

Names and Grades of all students:
[['nikhil', 50.0], ['arun', 70.0], ['bhushan', 78.0], ['gopal', 67.0], ['mukesh ', 76.0]]

Second lowest grade:  67.0

Names:
gopal
```

Write a Python program to extract the nth element from a given list of tuples using lambda.

```
def extract_nth_element(test_list, n):
    result = list(map (lambda x:(x[n]), test_list))
    return result
students = [('Greyson Fulton', 98, 99), ('Brady Kent', 97, 96), ('Wyatt Knott', 91, 94), ('Beau Turnbull', 94, 98)]
print ("Original list:")
print(students)
n = 0
print("\nExtract nth element ( n =",n,") from the said list of tuples:")
print(extract_nth_element(students, n))
n = 2
print("\nExtract nth element ( n =",n,") from the said list of tuples:")
print(extract_nth_element(students, n))
```

```
Original list:
[('Greyson Fulton', 98, 99), ('Brady Kent', 97, 96), ('Wyatt Knott', 91, 94), ('Beau Turnbull', 94, 98)]

Extract nth element ( n = 0 ) from the said list of tuples:
['Greyson Fulton', 'Brady Kent', 'Wyatt Knott', 'Beau Turnbull']

Extract nth element ( n = 2 ) from the said list of tuples:
[99, 96, 94, 98]
```

Double-click (or enter) to edit

✓ 0s completed at 3:02 AM