

# Rajalakshmi Engineering College

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## NeoColab\_REC\_CS23221\_Python Programming

### REC\_Python\_Week 5\_CY

Attempt : 1  
Total Mark : 40  
Marks Obtained : 40

### Section 1 : Coding

#### 1. Problem Statement

Alex is working with grayscale pixel intensities from an old photo that has been scanned in a single row. To detect edges in the image, Alex needs to calculate the differences between each pair of consecutive pixel intensities.

Your task is to write a program that performs this calculation and returns the result as a tuple of differences.

#### ***Input Format***

The first line of input contains an integer  $n$ , representing the number of pixel intensities.

The second line contains  $n$  space-separated integers representing the pixel intensities.

### **Output Format**

The output displays a tuple containing the absolute differences between consecutive pixel intensities.

Refer to the sample output for format specifications.

### **Sample Test Case**

Input: 5

200 100 20 80 10

Output: (100, 80, 60, 70)

### **Answer**

```
# You are using Python
n=int(input())
pixels=list(map(int,input().split()))
diff=tuple(abs(pixels[i]-pixels[i+1]) for i in range(n-1))
print(diff)
```

**Status :** Correct

**Marks :** 10/10

## **2. Problem Statement**

Emily is a librarian who keeps track of books borrowed and returned by her patrons. She maintains four sets of book IDs: the first set represents books borrowed, the second set represents books returned, the third set represents books added to the collection, and the fourth set represents books that are now missing. Emily wants to determine which books are still borrowed but not returned, as well as those that were added but are now missing. Finally, she needs to find all unique book IDs from both results.

Help Emily by writing a program that performs the following operations on four sets of integers:

Compute the difference between the borrowed books (first set) and the returned books (second set). Compute the difference between the added

books (third set) and the missing books (fourth set). Find the union of the results from the previous two steps, and sort the final result in descending order.

### ***Input Format***

The first line of input consists of a list of integers representing borrowed books.

The second line of input consists of a list of integers representing returned books.

The third line of input consists of a list of integers representing added books.

The fourth line of input consists of a list of integers representing missing books.

### ***Output Format***

The first line of output displays the difference between sets P and Q, sorted in descending order.

The second line of output displays the difference between sets R and S, sorted in descending order.

The third line of output displays the union of the differences from the previous two steps, sorted in descending order.

Refer to the sample output for the formatting specifications.

### ***Sample Test Case***

Input: 1 2 3

2 3 4

5 6 7

6 7 8

Output: [1]

[5]

[5, 1]

### ***Answer***

# You are using Python

```
b,r,a,m=[set(map(int,input().split())) for _ in range(4)]
```

```
b_not_r=sorted(b-r,reverse=True)
a_not_m=sorted(a-m,reverse=True)
unique_books=sorted(set(b_not_r) | set(a_not_m),reverse=True)
print(b_not_r)
print(a_not_m)
print(unique_books)
```

**Status :** Correct

**Marks :** 10/10

### 3. Problem Statement

Riley is analyzing DNA sequences and needs to determine which bases match at the same positions in two given DNA sequences. Each DNA sequence is represented as a tuple of integers, where each integer corresponds to a DNA base.

Your task is to write a program that compares these two sequences and identifies the bases that match at the same positions and print it.

#### ***Input Format***

The first line of input consists of an integer  $n$ , representing the size of the first tuple.

The second line contains  $n$  space-separated integers, representing the elements of the first DNA sequence tuple.

The third line of input consists of an integer  $m$ , representing the size of the second tuple.

The fourth line contains  $m$  space-separated integers, representing the elements of the second DNA sequence tuple.

#### ***Output Format***

The output is a space-separated integer of the matching bases at the same positions in both sequences.

Refer to the sample output for format specifications.

### Sample Test Case

Input: 4

5 1 8 4

4

4 1 8 2

Output: 1 8

### Answer

# You are using Python

```
n = int(input())
```

```
seq1 = tuple(map(int,input().split()))
```

```
m = int(input())
```

```
seq2 = tuple(map(int,input().split()))
```

```
m_bases=[seq1[i] for i in range(min(n, m)) if seq1[i]!=seq2[i]]
```

```
print(" ".join(map(str,m_bases)))
```

Status : Correct

Marks : 10/10

## 4. Problem Statement

Alex is tasked with managing the membership lists of several exclusive clubs. Each club has its own list of members, and Alex needs to determine the unique members who are part of exactly one club when considering all clubs together.

Your goal is to help Alex by writing a program that calculates the symmetric difference of membership lists from multiple clubs and then finds the total number of unique members.

### Input Format

The first line of input consists of an integer  $k$ , representing the number of clubs.

The next  $k$  lines each contain a space-separated list of integers, where each integer represents a member's ID.

### Output Format

The first line of output displays the symmetric difference of the membership lists as a set.

The second line displays the sum of the elements in this symmetric difference.

Refer to the sample output for the formatting specifications.

**Sample Test Case**

Input: 3

1 2 3

2 3 4

5 6 7

Output: {1, 4, 5, 6, 7}

23

**Answer**

```
# You are using Python
```

```
k = int(input())
```

```
# Read membership lists as sets
```

```
clubs = [set(map(int, input().split())) for _ in range(k)]
```

```
# Compute symmetric difference across all clubs
```

```
symmetric_diff = set()
```

```
for club in clubs:
```

```
    symmetric_diff ^= club # Apply symmetric difference iteratively
```

```
# Print results
```

```
print(symmetric_diff)
```

```
print(sum(symmetric_diff))
```

**Status : Correct**

**Marks : 10/10**

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## NeoColab\_REC\_CS23221\_Python Programming

### REC\_Python\_Week 5\_PAH

Attempt : 1  
Total Mark : 60  
Marks Obtained : 60

### Section 1 : Coding

#### 1. Problem Statement

Mia is organizing a list of integers into a series of pairs for his new project. She wants to create pairs of consecutive integers from the list. The last integer should be paired with None to complete the series. The pairing happens as follows: ((Element 1, Element 2), (Element 2, Element 3)..... (Element n, None)).

Your task is to help Henry by writing a Python program that reads a list of integers, forms these pairs, and displays the result in tuple format.

#### ***Input Format***

The first line of input consists of an integer n, representing the number of elements in the tuple.

The second line of input contains n space-separated integers, representing the elements of the tuple.

### **Output Format**

The output displays a tuple containing pairs of consecutive integers from the input. The last integer in the tuple is paired with 'None'.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 3

5 10 15

Output: ((5, 10), (10, 15), (15, None))

### **Answer**

```
# You are using Python
n = int(input())
elements = list(map(int, input().split()))
pairs = [(elements[i], elements[i+1]) for i in range(n-1)]
pairs.append((elements[-1], None))
print(tuple(pairs))
```

**Status :** Correct

**Marks :** 10/10

## **2. Problem Statement**

Tom wants to create a dictionary that lists the first n prime numbers, where each key represents the position of the prime number, and the value is the prime number itself.

Help Tom generate this dictionary based on the input she provides.

### **Input Format**

The input consists of an integer n, representing the number of prime numbers Tom wants to generate.

### **Output Format**



The output displays the generated dictionary where each key is an integer from 1 to n, and the corresponding value is the prime number.

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 4

Output: {1: 2, 2: 3, 3: 5, 4: 7}

### **Answer**

```
# You are using Python
def is_prime(num):
    return num > 1 and all(num % i != 0 for i in range(2, int(num**0.5) + 1))
n = int(input())
primes = {}
num, count = 2, 1
while count <= n:
    if is_prime(num):
        primes[count] = num
        count += 1
    num += 1
print(primes)
```

**Status :** Correct

**Marks : 10/10**

### **3. Problem Statement**

Rishi is working on a program to manipulate a set of integers. The program should allow users to perform the following operations:

Find the maximum value in the set. Find the minimum value in the set. Remove a specific number from the set.

The program should handle these operations based on user input. If the user inputs an invalid operation choice, the program should indicate that the choice is invalid.

### ***Input Format***

The first line contains space-separated integers that will form the initial set. Each integer  $x$  is separated by a space.

The second line contains an integer  $ch$ , representing the user's choice:

- 1 to find the maximum value
- 2 to find the minimum value
- 3 to remove a specific number from the set

If  $ch$  is 3, the third line contains an integer  $n1$ , which is the number to be removed from the set.

### ***Output Format***

The first line of output prints the original set in descending order.

For choice 1: Print the maximum value from the set.

For choice 2: Print the minimum value from the set.

For choice 3: Print the set after removing the specified number, in descending order.

For invalid choices: Print "Invalid choice".

Refer to the sample output for the formatting specifications.

### ***Sample Test Case***

Input: 1 2 3 4 5

1

Output: {5, 4, 3, 2, 1}

5

### ***Answer***

```
# You are using Python
elements=set(map(int,input().split()))
ch=int(input())
print("{", " , ".join(map(str,sorted(elements,reverse=True))), "}", sep="")
```

```

if ch==1:
    print(max(elements))
elif ch==2:
    print(min(elements))
elif ch==3:
    n1=int(input())
    elements.discard(n1)
    print("{", " ", ".join(map(str,sorted(elements,reverse=True))), "}", sep="")
else:
    print("Invalid choice")

```

**Status :** Correct

**Marks :** 10/10

#### 4. Problem Statement

Sophia is organizing a list of event IDs representing consecutive days of an event. She needs to group these IDs into consecutive sequences. For example, if the IDs 3, 4, and 5 appear consecutively, they should be grouped.

Write a program that helps Sophia by reading the total number of event IDs and the IDs themselves, then display each group of consecutive IDs in tuple format.

##### **Input Format**

The first line of input consists of an integer  $n$ , representing the number of event IDs.

The next  $n$  lines contain integers representing the event IDs, where each integer corresponds to an event ID.

##### **Output Format**

The output should display each group of consecutive event IDs in a tuple format. Each group should be printed on a new line, and single event IDs should be displayed as a single-element tuple.

Refer to the sample output for formatting specifications.

### Sample Test Case

Input: 3

1  
2  
3

Output: (1, 2, 3)

### Answer

```
n=int(input())
ids=sorted(int(input()) for _ in range(n))
groups,group=[],[ids[0]]
for i in range(1,n):
    if ids[i]==ids[i-1] + 1:
        group.append(ids[i])
    else:
        groups.append(tuple(group))
        group=[ids[i]]
groups.append(tuple(group))
for g in groups:
    if len(g)==1:
        print(f"({g[0]})")
    else:
        print(g)
```

Status : Correct

Marks : 10/10

## 5. Problem Statement

Jordan is creating a program to process a list of integers. The program should take a list of integers as input, remove any duplicate integers while preserving their original order, concatenate the remaining unique integers into a single string, and then print the result.

Help Jordan in implementing the same.

### Input Format

The input consists of space-separated integers representing the elements of the set.

### Output Format

The output prints a single integer formed by concatenating the unique integers from the input in the order they appeared.

Refer to the sample output for the formatting specifications.

### **Sample Test Case**

Input: 11 11 33 50

Output: 113350

### **Answer**

```
# You are using Python
numbers = input().split()
unique_numbers = []
seen = set()
for num in numbers:
    if num not in seen:
        unique_numbers.append(num)
        seen.add(num)
print("".join(unique_numbers))
```

**Status :** Correct

**Marks :** 10/10

## **6. Problem Statement**

Maya wants to create a dictionary that maps each integer from 1 to a given number  $n$  to its square. She will use this dictionary to quickly reference the square of any number up to  $n$ .

Help Maya generate this dictionary based on the input she provides.

### **Input Format**

The input consists of an integer  $n$ , representing the highest number for which Maya wants to calculate the square.

### **Output Format**

The output displays the generated dictionary where each key is an integer from 1 to  $n$ , and the corresponding value is its square.

Refer to the sample output for formatting specifications.

**Sample Test Case**

Input: 5

Output: {1: 1, 2: 4, 3: 9, 4: 16, 5: 25}

**Answer**

# You are using Python

```
n = int(input())
```

```
square_dict = {i: i**2 for i in range(1, n+1)}
```

```
print(square_dict)
```

**Status :** Correct

**Marks :** 10/10

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## NeoColab\_REC\_CS23221\_Python Programming

### REC\_Python\_Week 5\_COD

Attempt : 1  
Total Mark : 50  
Marks Obtained : 50

### Section 1 : Coding

#### 1. Problem Statement

Professor Adams needs to analyze student participation in three recent academic workshops. She has three sets of student IDs: the first set contains students who registered for the workshops, the second set contains students who actually attended, and the third set contains students who dropped out.

Professor Adams needs to determine which students who registered also attended, and then identify which of these students did not drop out.

Help Professor Adams identify the students who registered, attended, and did not drop out of the workshops.

#### ***Input Format***

The first line of input consists of integers, representing the student IDs who registered for the workshops.

The second line consists of integers, representing the student IDs who attended the workshops.

The third line consists of integers, representing the student IDs who dropped out of the workshops.

### ***Output Format***

The first line of output displays the intersection of the first two sets, which shows the IDs of students who registered and attended.

The second line displays the result after removing student IDs that are in the third set (dropped out), showing the IDs of students who both attended and did not drop out.

Refer to the sample output for the formatting specifications.

### ***Sample Test Case***

Input: 1 2 3

2 3 4

3 4 5

Output: {2, 3}

{2}

### ***Answer***

# You are using Python

```
registered=set(map(int, input().split()))
```

```
attended=set(map(int, input().split()))
```

```
dropped_out = set(map(int, input().split()))
```

```
registered_and_attended = registered & attended
```

```
print(registered_and_attended)
```

```
final_students=registered_and_attended-dropped_out
```

```
print(final_students)
```

**Status :** Correct

**Marks :** 10/10



## 2. Problem Statement

Gowshik is working on a task that involves taking two lists of integers as input, finding the element-wise sum of the corresponding elements, and then creating a tuple containing the sum values.

Write a program to help Gowshik with this task.

Example:

Given list:

[1, 2, 3, 4]

[3, 5, 2, 1]

An element-wise sum of the said tuples: (4, 7, 5, 5)

### ***Input Format***

The first line of input consists of a single integer  $n$ , representing the length of the input lists.

The second line of input consists of  $n$  integers separated by commas, representing the elements of the first list.

The third line of input consists of  $n$  integers separated by commas, representing the elements of the second list.

### ***Output Format***

The output is a single line containing a tuple of integers separated by commas, representing the element-wise sum of the corresponding elements from the two input lists.

Refer to the sample output for the formatting specifications.

### ***Sample Test Case***

Input: 4  
1, 2, 3, 4

3, 5, 2, 1

Output: (4, 7, 5, 5)

**Answer**

```
# You are using Python
n=int(input())
list1=list(map(int,input().split(',')))
list2=list(map(int,input().split(',')))
sum_tuple=tuple(a+b for a,b in zip(list1,list2))
print(sum_tuple)
```

**Status :** Correct

**Marks :** 10/10

**3. Problem Statement**

Ella is analyzing the sales data for a new online shopping platform. She has a record of customer transactions where each customer's data includes their ID and a list of amounts spent on different items. Ella needs to determine the total amount spent by each customer and identify the highest single expenditure for each customer.

Your task is to write a program that computes these details and displays them in a dictionary.

**Input Format**

The first line of input consists of an integer  $n$ , representing the number of customers.

Each of the next  $n$  lines contains a numerical customer ID followed by integers representing the amounts spent on different items.

**Output Format**

The output displays a dictionary where the keys are customer IDs and the values are lists containing two integers: the total expenditure and the maximum single expenditure.

Refer to the sample output for formatting specifications.

### Sample Test Case

Input: 2

101 100 150 200

102 50 75 100

Output: {101: [450, 200], 102: [225, 100]}

### Answer

# You are using Python

```
n = int(input())
```

```
customer_data = {}
```

```
for _ in range(n):
```

```
    transaction = list(map(int, input().split()))
```

```
    customer_id = transaction[0]
```

```
    amounts = transaction[1:]
```

```
    total_spent = sum(amounts)
```

```
    max_spent = max(amounts)
```

```
    customer_data[customer_id] = [total_spent, max_spent]
```

```
print(customer_data)
```

Status : Correct

Marks : 10/10

## 4. Problem Statement

Liam is analyzing a list of product IDs from a recent sales report. He needs to determine how frequently each product ID appears and calculate the following metrics:

Frequency of each product ID: A dictionary where the key is the product ID and the value is the number of times it appears. Total number of unique product IDs. Average frequency of product IDs: The average count of all product IDs.

Write a program to read the product IDs, compute these metrics, and output the results.

### Example

Input:

6 //number of product ID

101

102

101

103

101

102 //product IDs

Output:

{101: 3, 102: 2, 103: 1}

Total Unique IDs: 3

Average Frequency: 2.00

Explanation:

Input 6 indicates that you will enter 6 product IDs.

A dictionary is created to track the frequency of each product ID.

Input 101: Added with a frequency of 1.

Input 102: Added with a frequency of 1.

Input 101: Frequency of 101 increased to 2.

Input 103: Added with a frequency of 1.

Input 101: Frequency of 101 increased to 3.

Input 102: Frequency of 102 increased to 2.

The dictionary now contains 3 unique IDs: 101, 102, and 103.

Total Unique is 3.

The average frequency is 2.00.

### ***Input Format***

The first line of input consists of an integer n, representing the number of product IDs.

The next n lines each contain a single integer, each representing a product ID.

### **Output Format**

The first line of output displays the frequency dictionary, which maps each product ID to its count.

The second line displays the total number of unique product IDs, preceded by "Total Unique IDs: ".

The third line displays the average frequency of the product IDs. This is calculated by dividing the total number of occurrences of all product IDs by the total number of unique product IDs, rounded to two decimal places. It is preceded by "Average Frequency: ".

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 6

101

102

101

103

101

102

Output: {101: 3, 102: 2, 103: 1}

Total Unique IDs: 3

Average Frequency: 2.00

### **Answer**

# You are using Python

```
n = int(input())
```

```
product_freq = {}
```

```
for _ in range(n):
```

```
    product_id = int(input())
```

```
    product_freq[product_id] = product_freq.get(product_id, 0) + 1
```

```
unique_count = len(product_freq)
```

```
average_frequency = sum(product_freq.values()) / unique_count
```

```
print(product_freq)
```

```
print(f"Total Unique IDs: {unique_count}")
print(f"Average Frequency: {average_frequency:.2f}")
```

**Status :** Correct

**Marks :** 10/10

## 5. Problem Statement

James is managing a list of inventory items in a warehouse. Each item is recorded as a tuple, where the first element is the item ID and the second element is a list of quantities available for that item. James needs to filter out all quantities that are above a certain threshold to find items that have a stock level above this limit.

Help James by writing a program to process these tuples, filter the quantities from all the available items, and display the results.

Note:

Use the `filter()` function to filter out the quantities greater than the specified threshold for each item's stock list.

### ***Input Format***

The first line of input consists of an integer `N`, representing the number of tuples.

The next `N` lines each contain a tuple in the format `(ID, [quantity1, quantity2, ...])`, where `ID` is an integer and the list contains integers.

The final line consists of an integer threshold, representing the quantity threshold.

### ***Output Format***

The output should be a single line displaying the filtered quantities, space-separated. Each quantity is strictly greater than the given threshold.

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 2  
(1, [1, 2])  
(2, [3, 4])  
2

Output: 3 4

**Answer**

```
# You are using Python
N = int(input())
inventory = []
for _ in range(N):
    item = eval(input())
    inventory.append(item)

threshold = int(input())
filtered_quantities = []
for _, quantities in inventory:
    for quantity in quantities:
        if quantity > threshold:
            filtered_quantities.append(quantity)
print(" ".join(map(str, filtered_quantities)))
```

**Status :** Correct

**Marks : 10/10**

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## NeoColab\_REC\_CS23221\_Python Programming

### REC\_Python\_Week 5\_MCQ

Attempt : 1  
Total Mark : 20  
Marks Obtained : 17

#### Section 1 : MCQ

1. Predict the output of the following Python program

```
init_tuple_a = 1, 2, 8  
init_tuple_b = (1, 2, 7)  
set1=set(init_tuple_b)  
set2=set(init_tuple_a)  
print (set1 | set2)  
print (init_tuple_a | init_tuple_b)
```

**Answer**

TypeError: unsupported operand type

**Status : Wrong**

**Marks : 0/1**

2. Fill in the code in order to get the following output.



Output:

Tuple: (1, 3, 4)

Max value: 4

t=(1,)

---

```
print("Tuple:" ,t)
```

```
print("Max value:",_____)
```

**Answer**

1) t=t+(3,4) 2) max(t)

**Status : Correct**

**Marks : 1/1**

3. What will be the output of the following code?

```
a=(1,2,3,4)
```

```
print(sum(a,3))
```

**Answer**

13

**Status : Correct**

**Marks : 1/1**

4. If 'a' is a dictionary with some key-value pairs, what does a.popitem() do?

**Answer**

Removes an arbitrary element

**Status : Correct**

**Marks : 1/1**

5. What will be the output for the following code?

```
t1 = (1, 2, 4, 3)
```

```
t2 = (1, 2, 3, 4)
```

```
print(t1 < t2)
```

**Answer**

False

**Status :** Correct

**Marks :** 1/1

6. What will be the output?

```
a={'B':5,'A':9,'C':7}
print(sorted(a))
```

**Answer**

['A', 'B', 'C'].

**Status :** Correct

**Marks :** 1/1

7. Suppose  $t = (1, 2, 4, 3)$ , which of the following is incorrect?

**Answer**

```
print(t[3])
```

**Status :** Wrong

**Marks :** 0/1

8. Set  $s1 = \{1, 2, 4, 3\}$  and  $s2 = \{1, 5, 4, 6\}$ , find  $s1 \& s2$ ,  $s1 - s2$ ,  $s1 | s2$  and  $s1 \wedge s2$ .

**Answer**

$s1 \& s2 = \{1, 4\}$   $s1 - s2 = \{2, 3\}$   $s1 \wedge s2 = \{2, 3, 5, 6\}$   $s1 | s2 = \{1, 2, 3, 4, 5, 6\}$

**Status :** Correct

**Marks :** 1/1

9. What will be the output of the following program?

```
set1 = {1, 2, 3}
set2 = set1.copy()
set2.add(4)
print(set1)
```

**Answer**

{1, 2, 3}

**Status :** Correct

**Marks :** 1/1

10. What is the result of `print(type({}) is set)`?

**Answer**

False

**Status :** Correct

**Marks :** 1/1

11. What is the output of the below Python code?

```
list1 = [1, 2, 3]
list2 = [5, 6, 7]
list3 = [10, 11, 12]
set1 = set(list2)
set2 = set(list1)
set1.update(set2)
set1.update(list3)
print(set1)
```

**Answer**

{1, 2, 3, 5, 6, 7, 10, 11, 12}

**Status :** Correct

**Marks :** 1/1

12. What is the output of the following code?

```
a=(1,2,(4,5))
b=(1,2,(3,4))
print(a<b)
```

**Answer**

False

**Status :** Correct

**Marks :** 1/1

13. Which of the following is a Python tuple?

**Answer**

(1, 2, 3)

**Status :** Correct

**Marks :** 1/1

14. What is the output of the following code?

```
a={"a":1,"b":2,"c":3}
b=dict(zip(a.values(),a.keys()))
print(b)
```

**Answer**

{1: 'a', 2: 'b', 3: 'c'}

**Status :** Correct

**Marks :** 1/1

15. Which of the statements about dictionary values is false?

**Answer**

Values of a dictionary must be unique

**Status :** Correct

**Marks :** 1/1

16. What is the output of the following code?

```
a={1:"A",2:"B",3:"C"}
b=a.copy()
b[2]="D"
print(a)
```

**Answer**

{1: 'A', 2: 'B', 3: 'C'}

**Status :** Correct

**Marks :** 1/1

17. What is the output of the following?

```
set1 = {10, 20, 30, 40, 50}
set2 = {60, 70, 10, 30, 40, 80, 20, 50}
print(set1.issubset(set2))
print(set2.issuperset(set1))
```

**Answer**

TrueTrue

**Status :** Correct

**Marks :** 1/1

18. Which of the following statements is used to create an empty tuple?

**Answer**

()

**Status :** Correct

**Marks :** 1/1

19. Which of the following isn't true about dictionary keys?

**Answer**

Keys must be immutable

**Status :** Wrong

**Marks :** 0/1

20. What will be the output for the following code?

```
a=(1,2,3)
b=('A','B','C')
c=zip(a,b)
```

```
print(c)
print(tuple(c))
```

**Answer**

((1, 'A'), (2, 'B'), (3, 'C'))

**Status :** Correct

**Marks :** 1/1