LISTS

1. List of Squares

```python
squares = []
for i in range(1, 21):
    squares.append(i ** 2)
print(squares)
```

2. Second Largest Number

```python
def second_largest(lst):
    first = second = float('-inf')
    for num in lst:
        if num > first:
            second = first
            first = num
        elif num > second and num != first:
            second = num
    return second

print(second_largest([10, 20, 4, 45, 99]))
```

3. Remove Duplicates

```python
def remove_duplicates(lst):
    seen = set()
    result = []
    for item in lst:
        if item not in seen:
            seen.add(item)
            result.append(item)
    return result

print(remove_duplicates([1, 2, 2, 3, 4, 4, 5]))
```

4. Rotate List

```python
def rotate_right(lst, k):
    k = k % len(lst)
    result = []
    for i in range(len(lst)):
        result.append(lst[(i - k) % len(lst)])
    return result

print(rotate_right([1, 2, 3, 4, 5], 2))
```

5. List Compression (Even Numbers Doubled)

```python
nums = [1, 2, 3, 4, 5, 6]
result = []
for num in nums:
    if num % 2 == 0:
        result.append(num * 2)
print(result)
```

TUPLES

6. Swap Values

```python
def swap_tuples(t1, t2):
    temp = t1
    t1 = t2
    t2 = temp
    return t1, t2

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

7. Unpack Tuples

```python
student = ("Alice", 20, "AI", "A")
name = student[0]
age = student[1]
branch = student[2]
grade = student[3]
print(name + " is " + str(age) + " years old, studying " + branch + ",
and got grade " + grade + ".")
```

8. Tuple to Dictionary

```python
t = (("a", 1), ("b", 2))
d = {}
for pair in t:
    d[pair[0]] = pair[1]
print(d)
```

SETS

9. Common Items

```python
list1 = input("Enter list 1: ").split()
list2 = input("Enter list 2: ").split()
set1 = set(list1)
set2 = set(list2)
common = set1.intersection(set2)
print("Common items:", common)
```

10. Unique Words in Sentence

```python
sentence = input("Enter a sentence: ")
words = sentence.split()
unique = set()
for word in words:
    unique.add(word)
print("Unique words:", unique)
```

11. Symmetric Difference

```python
a = {1, 2, 3}
b = {3, 4, 5}
sym_diff = a.union(b) - a.intersection(b)
print("Symmetric difference:", sym_diff)
```

12. Subset Checker

```python
a = {1, 2}
b = {1, 2, 3, 4}
is_subset = True
for item in a:
    if item not in b:
        is_subset = False
        break
print(is_subset)
```

DICTIONARIES

13. Frequency Counter

```python
text = "hello world"
freq = {}
for char in text:
    if char in freq:
        freq[char] += 1
    else:
        freq[char] = 1
print(freq)
```

14. Student Grade Book

```python
grades = {}
for _ in range(3):
    name = input("Name: ")
    mark = int(input("Marks: "))
    if mark >= 90:
        grade = "A"
    elif mark >= 75:
        grade = "B"
    else:
        grade = "C"
    grades[name] = grade

query = input("Enter student name to check grade: ")
if query in grades:
    print("Grade:", grades[query])
else:
    print("Not Found")
```

15. Merge Two Dictionaries

```python
d1 = {'a': 10, 'b': 20}
d2 = {'b': 5, 'c': 30}
merged = {}

for key in d1:
    merged[key] = d1[key]

for key in d2:
    if key in merged:
        merged[key] += d2[key]
    else:
        merged[key] = d2[key]

print(merged)
```

16. Inverted Dictionary

```python
d = {"a": 1, "b": 2}
inverted = {}
for key in d:
    value = d[key]
    inverted[value] = key
print(inverted)
```

17. Group Words by Length

```python
words = ["apple", "bat", "car", "elephant"]
grouped = {}
for word in words:
    length = len(word)
    if length in grouped:
        grouped[length].append(word)
    else:
        grouped[length] = [word]
print(grouped)
```