



# NUST

COLLEGE OF ELECTRICAL &  
MECHANICAL ENGINEERING



## Digital Image Processing

### Lab 1

Submitted by:

| Name:        | Reg:   |
|--------------|--------|
| Furqan Ahmad | 352076 |

Submitted to:

| Course Inst:   | Lab Eng:      |
|----------------|---------------|
| Dr Usman Akram | Sundas Ashraf |

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## 1 Code:

```
def
Sorting_my_list(my_list,sorting_criteria="age",sorti
ng_order="ascending"):
    """This function is used to sort the given
list"""
    if sorting_order=="Ascending" or
sorting_order=="ascending":
        if sorting_criteria=="Age" or
sorting_criteria=="age":
            for i in range(len(my_list)):
                for j in range(len(my_list)):
                    if my_list[i][0]<my_list[j][0]:
                        my_list[j],my_list[i]=my_lis
t[i],my_list[j]
            return my_list

        elif sorting_criteria=="GPA" or
sorting_criteria=="gpa" or sorting_criteria=="Gpa":
            for i in range(len(my_list)):
                for j in range(len(my_list)):
                    if my_list[i][1]<my_list[j][1]:
                        my_list[j],my_list[i]=my_lis
t[i],my_list[j]
            return my_list

        elif sorting_criteria=="City" or
sorting_criteria=="city":
            for i in range(len(my_list)):
                for j in range(len(my_list)):
                    if my_list[i][2]<my_list[j][2]:
                        my_list[j],my_list[i]=my_lis
t[i],my_list[j]
            return my_list

        else:
            print("Error Invalide Sorting Criteria")
            return my_list
```

```

        elif sorting_order=="Descending" or
sorting_order=="descending":
            if sorting_criteria=="Age" or
sorting_criteria=="age":
                for i in range(len(my_list)):
                    for j in range(len(my_list)):
                        if my_list[i][0]>my_list[j][0]:
                            my_list[j],my_list[i]=my_list[i],my_list[j]
            return my_list

        elif sorting_criteria=="GPA" or
sorting_criteria=="gpa" or sorting_criteria=="Gpa":
            for i in range(len(my_list)):
                for j in range(len(my_list)):
                    if my_list[i][1]>my_list[j][1]:
                        my_list[j],my_list[i]=my_list[i],my_list[j]
            return my_list

        elif sorting_criteria=="City" or
sorting_criteria=="city":
            for i in range(len(my_list)):
                for j in range(len(my_list)):
                    if my_list[i][2]>my_list[j][2]:
                        my_list[j],my_list[i]=my_list[i],my_list[j]
            return my_list

        else:
            print("Error Invilide Sorting Criteria")
            return my_list

    else:
        print("Error Invilide Sorting Order")
        return my_list

mylist=[[29, 3.2, 'Rawalpindi'], [22, 4.0,
'Islamabad'], [12, 0, 'Karachi']]

```

```

sort_criteria=str(input("Enter criteria
Order(age,gpa,city)"))
sort_order=str(input("Enter Sorting
Order(ascending,descending)"))

for i in mylist:
    print(f"Age={i[0]}|GPA={i[1]}|City={i[2]}")

print("-----")
print("After Sorting")

for i in
Sorting_my_list(mylist,sort_criteria,sort_order):
    print(f"Age={i[0]}|GPA={i[1]}|City={i[2]}")

```

## Output:

```

PS E:\6th Semester\Digital Image Processing\Lab\Lab_1> python -u "
Enter criteria Order(age,gpa,city)age
Enter Sorting Order(ascending,descending)ascending
Age=29|GPA=3.2|City=Rawalpindi
Age=22|GPA=4.0|City=Islamabad
Age=12|GPA=0|City=Karachi
-----
After Sorting
Age=12|GPA=0|City=Karachi
Age=22|GPA=4.0|City=Islamabad
Age=29|GPA=3.2|City=Rawalpindi
PS E:\6th Semester\Digital Image Processing\Lab\Lab_1> python -u "
Enter criteria Order(age,gpa,city)gpa
Enter Sorting Order(ascending,descending)descending
Age=29|GPA=3.2|City=Rawalpindi
Age=22|GPA=4.0|City=Islamabad
Age=12|GPA=0|City=Karachi
-----
After Sorting
Age=22|GPA=4.0|City=Islamabad
Age=29|GPA=3.2|City=Rawalpindi
Age=12|GPA=0|City=Karachi
PS E:\6th Semester\Digital Image Processing\Lab\Lab_1>

```

## 2 Code:

```

def conversion(number,system):
    """This function convert the decimal value to
    binary octal and hexa"""

```

```

return_value=[]
if system=="bin":
    print("To binary:")
    while number>0:
        return_value.append(number%2)
        number=int(number/2)
elif system=="oct":
    print("To binary:")
    while number>0:
        return_value.append(number%8)
        number=int(number/8)
elif system=="hex":
    print("To binary:")
    while number>0:
        if (number%16)==10:
            return_value.append('A')
        elif (number%16)==11:
            return_value.append('B')
        elif (number%16)==12:
            return_value.append('C')
        elif (number%16)==13:
            return_value.append('D')
        elif (number%16)==14:
            return_value.append('E')
        elif (number%16)==15:
            return_value.append('F')
        else:
            return_value.append(number%16)
        number=int(number/16)
    return return_value

number=int(input("Enter Number"))
system=input("Enter Number system(oct,bin,hex)")
myreturn=conversion(number,system)
for i in range(len(myreturn),0,-1):
    print(myreturn[i-1],end=' ')

```

**Output:**

```

PS E:\6th Semester\Digital Image Processing\Lab\Lab_1> python
Enter Number2000
Enter Number system(oct,bin,hex)oct
To binary:
3720
PS E:\6th Semester\Digital Image Processing\Lab\Lab_1> python
Enter Number142
Enter Number system(oct,bin,hex)bin
To binary:
10001110
PS E:\6th Semester\Digital Image Processing\Lab\Lab_1> python
Enter Number255
Enter Number system(oct,bin,hex)hex
To binary:
FF
PS E:\6th Semester\Digital Image Processing\Lab\Lab_1>

```

### 3 Code:

### 4 Code:

```

def tomorse_code(message):
    message=message.upper()

    mydictionary={'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':"---",'Z':"---",'0':"-----",'1':"----
", '2':"...--",'3':"...--",'4':"....-
                , '5':".....",'6':".....",'7':"--
...", '8':"---..",'9':"---..",' ':' ' }
    returnstring=''
    for i in message:
        returnstring+=mydictionary[i]
    return returnstring
user_message=str(input("Enter your message: "))
print("Morse Code= "+tomorse_code(user_message))

```

### Output:

```

PS E:\6th Semester\Digital Image Processing\Lab\Lab_1> python -u "e:\6th Semester\Digital Image Processing\Lab\Lab_1\Task_4.py"
Enter your message: The quick brown fox jumps over the lazy dog
Morse Code= .....
PS E:\6th Semester\Digital Image Processing\Lab\Lab_1> python -u "e:\6th Semester\Digital Image Processing\Lab\Lab_1\Task_4.py"
Enter your message: 03131913200
Morse Code= .....
PS E:\6th Semester\Digital Image Processing\Lab\Lab_1>

```

## 5 Code:

```

import random
import string

def search_word(puzzle, word):
    for i in range(len(puzzle)):
        for j in range(len(puzzle[i])):
            if puzzle[i][j] == word[0]:
                # check horizontally
                if
''.join(puzzle[i][j:j+len(word)]) == word:
                    return True
                # check vertically
                if ''.join([puzzle[k][j] for k in
range(i, i+len(word))]) == word:
                    return True
        return False

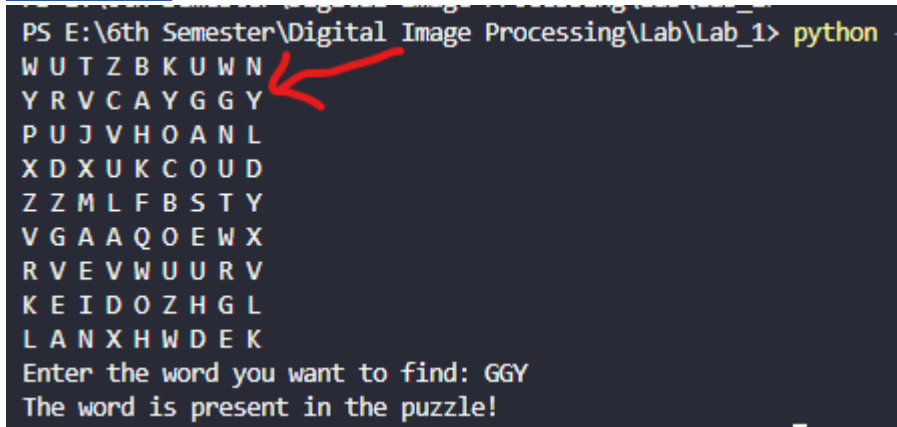
def generate_puzzle():
    n=9
    puzzle = []
    for j in range(n):
        row = []
        for i in range(n):
            letter =
random.choice(string.ascii_uppercase)
            row.append(letter)
        puzzle.append(row)
    return puzzle

def printing_puzzle(puzzle):
    for i in range(9):
        for j in range(9):
            print(puzzle[i][j], end=' ')
        print()
    puzzle=generate_puzzle()

```

```
printing_puzzle(puzzle)
word=input('Enter the word you want to find: ')
if search_word(puzzle,word)==True:
    print('The word is present in the puzzle!')
else:
    print('The word is not present in the puzzle')
```

### Output:



```
PS E:\6th Semester\Digital Image Processing\Lab\Lab_1> python -
WUTZBKUWN
YRVCA YGGY
PUJVHOANL
XDXUKC OUD
ZZMLFBSTY
VGAAQOE WX
RVEVWUURV
KEIDOZHGL
LANXHWDEK
Enter the word you want to find: GGY
The word is present in the puzzle!
```

### 6 Code:

```
def garland(word):
    degree = 0
    for i in range(1, len(word)):
        if word[:i] == word[-i:]:
            degree = i
    return degree
word=str(input("Enter a word: "))
print(garland(word))
```

### Output:



```

PS E:\6th Semester\Digital Image Processing\Lab\Lab_1> python -
Enter a word: oniononion
5
PS E:\6th Semester\Digital Image Processing\Lab\Lab_1>
PS E:\6th Semester\Digital Image Processing\Lab\Lab_1> python -
Enter a word: alfala
1
PS E:\6th Semester\Digital Image Processing\Lab\Lab_1> python -
Enter a word: hehehehehe
8
PS E:\6th Semester\Digital Image Processing\Lab\Lab_1> python -
Enter a word: programmer
0
PS E:\6th Semester\Digital Image Processing\Lab\Lab_1>

```

## 7 Code:

```

def min_max_normalization(lst):

    min_val = min(lst)
    max_val = max(lst)
    if min_val == max_val:
        return [0] * len(lst)
    normalized_lst = []
    for x in lst:
        normalized_x = (x - min_val) / (max_val -
min_val)
        normalized_lst.append(normalized_x)
    return normalized_lst
mylist=[5,8,0,45,7,3,9,2,90]
print(min_max_normalization(mylist))

```

## Output:

```

PS E:\6th Semester\Digital Image Processing\Lab\Lab_1> python -u "e:\6th Semester\Digital Image Processing\Lab\Lab_1\Task_7.py"
[0.05555555555555555, 0.08888888888888889, 0.0, 0.5, 0.07777777777777778, 0.03333333333333333, 0.1, 0.02222222222222223, 1.0]
PS E:\6th Semester\Digital Image Processing\Lab\Lab_1>

```

## 8 Code:

```

def matrix_sum(myarray):
    grid_sums = []
    for i in range(0, 9, 3):
        for j in range(0, 9, 3):

```

```
        grid_sum = sum(myarray[i][j:j+3]) +  
sum(myarray[i+1][j:j+3]) + sum(myarray[i+2][j:j+3])  
        grid_sums.append(grid_sum)  
    return grid_sums  
mymatrix = [[1, 2, 3, 4, 5, 6, 7, 8, 9],  
            [10, 11, 12, 13, 14, 15, 16, 17, 18],  
            [19, 20, 21, 22, 23, 24, 25, 26, 27],  
            [28, 29, 30, 31, 32, 33, 34, 35, 36],  
            [37, 38, 39, 40, 41, 42, 43, 44, 45],  
            [46, 47, 48, 49, 50, 51, 52, 53, 54],  
            [55, 56, 57, 58, 59, 60, 61, 62, 63],  
            [64, 65, 66, 67, 68, 69, 70, 71, 72],  
            [73, 74, 75, 76, 77, 78, 79, 80, 81]]  
  
result = matrix_sum(mymatrix)  
print(result)
```

### Output:

```
PS E:\6th Semester\Digital Image Processing\Lab\Lab_1> python  
[99, 126, 153, 342, 369, 396, 585, 612, 639]  
PS E:\6th Semester\Digital Image Processing\Lab\Lab_1> |
```