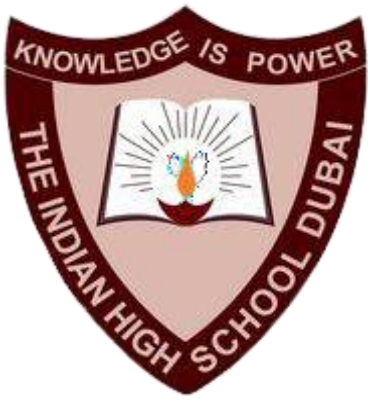
THE INDIAN HIGH SCHOOL - DUBAI



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[insert certificate here]

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INDEX

FUNCTIONS

Program 1

Aim: To write a function that takes 'n' number of integers and count the number of odd and even numbers.

Modules used: N/A

Data types used: Int

Script:

```
def count(*a) -> None:
    o, e = 0, 0
    for i in a:
        (e := e + 1) if i % 2 == 0 else (o := o + 1)
    print(f"No. of odd elements: {o}\nNo. of even elements: {e}")

count(1,2,3,4,5,6,7,8)
```

Output:

```
No. of odd elements: 4
No. of even elements: 4
>>>
```

Program 2

Aim: To write a function to find the sum of the series: $1 + x^2 + x^3 + \cdots + x^n$

Modules used: N/A

Data types used: Int

Script:

```
def series(x: int, n: int) -> None:
    s = 1
    for i in range(n): s += x**(i+1)
    print(f"Sum of the series is: {s}")

series(2, 16)
```

Output:

```
    Sum of the series is: 131071
>>>
```

Program 3

Aim: To write a function to find the factorial of a number without taking an argument

Modules used: N/A

Data types used: Int

Script:

```
n = int(input(">>> "))
def fact() -> int:
    global n
    return n * (n := n - 1, fact())[1] if n > 1 else 1

print(f"Factorial of {n} is: {fact()}")
```

Output:

```
>>> 5
Factorial of 5 is: 120
```

Program 4

Aim: To write a function that takes a list of strings and return the emails that contain the substring "@cmail"

Modules used: N/A

Data types used: String, List

Script:

```
r = input(">>> ").split()
def validMailID(l: list) -> list:
    return [i for i in l if "@cmail" in i]

print(f"Valid email IDs are:\n - " + "\n - ".join(validMailID(r)))
```

Output:

```
>>> asdf@cmail.com fdsa@cmail.com asdf@gmail.com swag@yahoo.gov
Valid email IDs are:
 - asdf@cmail.com
 - fdsa@cmail.com
```

Program 5

Aim: To write a function that takes a list of strings and returns the strings that are longer than 5 characters.

Modules used: N/A

Data types used: String, List

Script:

```
r = input(">>> ").split()
def longWords(l: list):
    return [i for i in l if len(i) > 5]

print(f"Words longer than 5 letters are:\n - " + "\n - ".join(longWords(r)))
```

Output:

```
>>> word1 antidisestablishmentarianism word2 wee asdf fdsa
Words longer than 5 letters are:
 - antidisestablishmentarianism
```

Program 6

Aim: To write a menu driven program to find odd/even numbers and prime numbers.

Modules used: math

Data types used: Int, Bool

Script:

```
import math

print("""
    #--------------------#
    |       NUMBERS      |
    | 1. even/odd        |
    | 2. prime/consonant |
    | 3. exit            |
    #--------------------#""")

def evenity(n: int) -> bool:
    return True if n % 2 == 0 else False

def primality(n: int) -> bool:
    return False if n <= 1 else (True if n == 2 else (False if n % 2 == 0 else all(n % i != 0 for i in range(3, int(math.sqrt(n)) + 1, 2))))


while True:
    o = int(input(">>> "))
    if o == 1:
        print(evenity(int(input("n: "))))
    elif o == 2:
        print(primality(int(input("n: "))))
    elif o == 3:
        break
    else:
        print("Invalid option selected")
```

Output:

```
    #--------------------#
    |       NUMBERS      |
    | 1. even/odd        |
    | 2. prime/consonant |
    | 3. exit            |
    #--------------------#
>>> 1
n: 43
False
>>> 2
n: 5
True
>>> 4
Invalid option selected
>>> 3
```

Program 7

Aim: To write a function that returns the greater of two numbers.

Modules used: N/A

Data types used: Tuple, Float

Script:

```
a, b = tuple([*map(float, input(">>> ").split())])
def findBig() -> float:
    global a, b
    return a if a > b else b

print(f"Bigger number: {findBig()}")
```

Output:

```
>>> 1 3
Bigger number: 3.0
```

Program 8

Aim: To write a function that takes a list and moves all the elements divisible by 5 to the end of the list.

Modules used: N/A

Data types used: List, Int

Script:

```
x = [*map(int, input(">>> ").split())]
def move(l: list) -> None:
    l[:] = [x for x in l if x % 5] + [x for x in l if x % 5 == 0]
    print(f"Ordered list is: {l}")

move(x)
```

Output:

```
>>> 1 2 5 4 6 58 65 2350 15
Ordered list is: [1, 2, 4, 6, 58, 5, 65, 2350, 15]
```

Program 9

Aim: Given a dictionary containing information about vehicles, display the vehicles that were released in 2020 and order the dict in alphabetical order by brand name.

Modules used: N/A

Data types used: Dict, Int, List, String

Script:

```
vehicle = {
    "car1": ["Toyota", "Camry", 2020, 25_000],
    "car2": ["Ford", "Explorer", 2019, 32_000],
    "car3": ["Chevy", "Silverado", 2021, 40_000],
    "car4.5": ["Honda", "Civic", 2020, 22_000],
    "car5": ["anotherRealCarBrand", "Model nine", 2023, 45_000]
}

def _2020(D: dict):
    print(f"No. of vehicles released in 2020: {len([c for c in D if c[2] == 2020])}")

def sort(D):
    def f(x):
        return x[1][0].lower()
    print("\n".join(f"{k}: {v}" for k, v in sorted(D.items(), key=f)))

_2020(vehicle)
print("\nSorted dict:")
sort(vehicle)
```

Output:

```
No. of vehicles released in 2020: 0

Sorted dict:
car5: ['anotherRealCarBrand', 'Model nine', 2023, 45000]
car3: ['Chevy', 'Silverado', 2021, 40000]
car2: ['Ford', 'Explorer', 2019, 32000]
car4.5: ['Honda', 'Civic', 2020, 22000]
car1: ['Toyota', 'Camry', 2020, 25000]
```

Program 10

Aim: To write a function that takes a tuple and returns the indices of the non-zero elements.

Modules used: N/A

Data types used: Int, Tuple, List

Script:

```
t = tuple([*map(int, input(">>> ").split())])
def indexTuple(t: tuple) -> list:
    return [i for i, v in enumerate(t) if v != 0]

print(f"Non zero indices are: {indexTuple(t)}")
```

Output:

```
>>> 1 0 25 03 64 00 5
Non zero indices are: [0, 2, 3, 4, 6]
```

Program 11

Aim: To write a function to count the number of vowels in user input.

Modules used: N/A

Data types used: String

Script:

```
r = input(">>> ")
def vowelCount() -> None:
    global r
    print(f"No. of vowels: {sum(i in "AEIOUaeiou" for i in r)}")

vowelCount()
```

Output:

```
>>> hello my name is star.stalker9160
No. of vowels: 8
```

FILE HANDLING – 1

TEXT FILES

Program 1

Aim: Write a function to count the number of lines that start with the alphabet 'W' or 'H'

Modules used: N/A

Data types used: Int, Str

Script:

```
def f() -> None:
    with open('dump/Journal Files/Country.txt') as f: return sum(1 for i in f.readlines() if i[0] in 'WH')

print(f"No. of words starting with W or H: {f()}")
```

Output:

```
No. of words starting with W or H: 1
>>>
```

Program 2

Aim: Write a function countWords() to display total number of words in a file

Modules used: N/A

Data types used: Int, Str

Script:

```
def countWords() -> None:
    with open('dump/Journal Files/Quotes.txt') as f: print(f"No. of words: {len([x for x in f.read().split() if x != "\n"])}")

countWords()
```

Output:

```
>>> ------------------
No. of words: 6
>>>
```

Program 3

Aim: Write a function filter(oldfile, newfile) that copies all lines from oldfile into newfile that don't start with '@'

Modules used: N/A

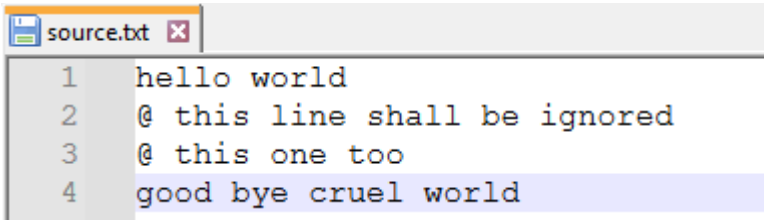
Data types used: Int, Str

Script:

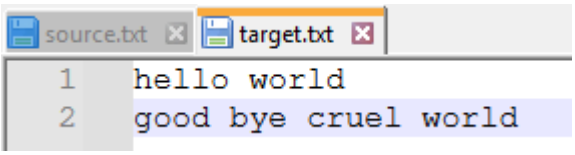
```
def filter(oldfile: str, newfile: str) -> None:
    with open(oldfile) as o, open(newfile, "w") as n:
        n.writelines([l for l in o if not l.startswith("@")])

filter("dump/Journal Files/source.txt", "dump/Journal Files/target.txt")
```

Output:

source.txt:



target.txt



Program 4

Aim: Write a function VowelCount that displays the occurrence of vowels in a file

Modules used: json

Data types used: Int, Str, Dict

Script:

```
import json

def VowelCount() -> None:
    with open("dump/Journal Files/MY_TEXT_FILE.txt") as f:
        t = f.read().lower()
    print(json.dumps({v: t.count(v) for v in 'aeiou'}, indent=4))

VowelCount()
```

Output:

```
{
    "a": 1,
    "e": 2,
    "i": 5,
    "o": 4,
    "u": 0
}
>>>
```

Program 5

Aim: Write a function to count the occurrence of ‘The’ and ‘This’

Modules used: N/A

Data types used: Int

Script:

python:

```
def f() -> None:
    with open('dump/Journal Files/MY_TEXT_FILE.txt') as f: return sum(1 for i in f.read().split() if (i == "The" or i == "This"))

print(f"Occourance of 'the' or 'this': {f()}")
```

MY_TEXT_FILE.txt:

MY_TEXT_FILE.txt

```
1   The world is so cool chat
2
3   The This is This-ing
```

Output:

```
>>> Occourance of 'the' or 'this': 3
>>>
```

Program 6

Aim: Write a function ISTOUPCOUNT to count the occurrence of 'IS', 'TO' and 'UP' in a file

Modules used: json

Data types used: Str, Dict, Int

Script:

python:

```
import json

def ISTOUPCOUNT() -> None:
    with open("dump/Journal Files/WRITER.txt") as f:
        w = f.read().split()
        print(json.dumps({"IS": w.count("IS"), "TO": w.count("TO"), "UP": w.count("UP")}, indent=4))

ISTOUPCOUNT()
```

WRITER.txt:

WRITER.txt

```
1   IS
2   TO
3   UP
4   UP
5   UP
6   DOWN
7   TO IS
```

Output:

```
{
    "IS": 2,
    "TO": 2,
    "UP": 3
}
>>>
```

Program 7

Aim: Write a function to print out the lines from a file that start with 'P'

Modules used: N/A

Data types used: Str, List

Script:

python:

```
def p() -> None:
    with open("dump/Journal Files/DIARY.txt") as f:
        [print(line, end="") for line in f if line.startswith("P")]

p()
```

DIARY.txt:

DIARY.txt

```
1   P line number 1
2   line that does not start with p
3   P <- heres another p line
```

Output:

```
P line number 1
P <- heres another p line
>>>
```

Program 8

Aim: Write a function to display the number of lines starting with 'H'

Modules used: N/A

Data types used: Int

Script:

python:

```
def h() -> None:
    with open("dump/Journal Files/para.txt") as f:
        print(sum(1 for l in f if l.startswith("H")))

h()
```

para.txt:

para.txt

```
1  Here is a paragraph
2  Hehehehehehe
3  This is so much fun
```

Output:

```
>>> 2
```

Program 9

Aim: Write a function AMCount to count the occurrences of 'a' and 'm' both upper and lower case

Modules used: json

Data types used: Str, Int, Dict

Script:

python:

```
import json

def AMCount() -> None:
    with open("dump/Journal Files/STORY.txt") as f:
        t = f.read()
        print(json.dumps({'a': t.count('a'), 'A': t.count('A'), 'm': t.count('m'), 'M': t.count('M')}, indent=4))

AMCount()
```

STORY.txt:

STORY.txt

```
i am wake up at 4am in the marning
and like
and
uhhhhhhh
idk
```

Output:

```
{
    "a": 7,
    "A": 0,
    "m": 3,
    "M": 0
}
>>>
```

Program 10

Aim: Write a function COUNT to count the occurrence of 'Catholic' and 'mother'

Modules used: json

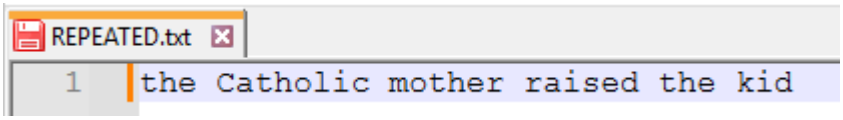
Data types used: Int, Str, Dict

Script:

python:

```
import json

def COUNT():
    with open("dump/Journal Files/REPEATED.txt") as f:
        t = f.read().split()
        print(json.dumps({"Catholic": t.count("Catholic"), "mother": t.count("mother")}, indent=4))

COUNT()
```

REPEATED.txt:



Output:

```
{
    "Catholic": 1,
    "mother": 1
}
>>>
```

Program 11

Aim: Write a function to print out the lines that have only 2 chars

Modules used: N/A

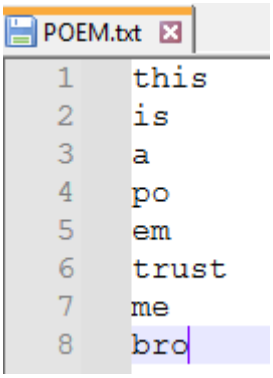
Data types used: Int, List, Str

Script:

python:

```
def _2chars():
    with open("dump/Journal Files/POEM.txt") as f:
        [print(w) for l in f for w in l.split() if len(w) == 2]

_2chars()
```

POEM.txt:



Output:

```
is
po
em
me
>>>
```

Program 12

Aim: Write a function COUNT_AND to count the occurrence of ‘and’ (case insensitive)

Modules used: N/A

Data types used: Int, Str

Script:

python:

```
def COUNT_AND():
    with open("dump/Journal Files/STORY.txt") as f:
        text = f.read().lower()
        print("Occourance of 'and': ", text.count("and"))

COUNT_AND()
```

STORY.txt:

STORY.txt

```
1  i am wake up at 4am in the marning
2  and like
3  and
4  uhhhhhhh
5  idk
```

Output:

```
>>> Occourance of 'and':  2
```

Program 13

Aim: Write a menu driven program to perform operations on a file

Modules used: N/A

Data types used: Int, List, Str

Script:

```
_f = "dump/Journal Files/POETIC.txt"

def CREATE():
    with open(_f, "w") as f:
        for i in range(int(input("Enter number of lines: "))):
            f.write(input(f"{i+1}. ") + "\n")

def DISPLAY():
    with open(_f) as f:
        print(f.read())

def COUNTCHAR():
    c = {"v": 0, "c": 0, "u": 0, "l": 0}
    with open(_f) as f:
        for char in f.read():
            if char in "aeiouAEIOU": c["v"] += 1
            elif char in "bcdfghjklmnpqrstvwxyzBCDFGHJKLMNPQRSTVWXYZ": c["c"] += 1
            if char.isupper(): c["u"] += 1
            elif char.islower(): c["l"] += 1
    print(c)

def HASHSHOW():
    with open(_f) as f:
        for l in f: print("#".join(l.split()))

def COPY():
    with open(_f) as f:
        l = f.readlines()
    with open("dump/Journal Files/special.txt", "w") as f1:
        f1.writelines([i for i in l if "#" in i])

def REPLACE():
    st, r = input("search: "), input("replace: ")
    with open(_f) as f:
        t = f.read()
    ct = t.replace(st, r)
    with open("dump/Journal Files/duplicate.txt", "w") as f:
        f.write(ct)
    print({"Original text": t, "Changed text": ct})

def DELETE():
    w = input("Enter the word to delete: ")
    with open(_f) as f:
        text = f.read()
    with open(_f, "w") as f:
        f.write(text.replace(w, ""))

def COUNTEND():
    with open(_f) as f:
        print({"count": sum(1 for line in f if line.rstrip().endswith(("y", "i")))})

def VOWEL():
    with open(_f) as f:
        t = f.read()
    with open("dump/Journal Files/vowel.txt", "w") as v:
        v.writelines([w + "\n" for w in t.split() if w[0].lower() in "aeiou"])
    print({"Original file": t, "Vowel file": open("dump/Journal Files/vowel.txt").read()})

def CHANGE():
    with open(_f) as f:
        text = f.read()
    ct = text.replace(" ", "**")
    with open("dump/Journal Files/changed.txt", "w") as f:
        f.write(ct)
    print({"Original text": text, "Changed text": ct})
```

```
print("""
        #-----------------------#
        |          rEee         |
        |   1. create           |
        |   2. display          |
        |   3. count characters |
        |   4. hash show        |
        |   5. copy             |
        |   6. replace          |
        |   7. delete           |
        |   8. count end        |
        |   9. vowel            |
        |   10. change          |
        |   11. exit            |
        |                       |
        #-----------------------#""")

options = {1: CREATE, 2: DISPLAY, 3: COUNTCHAR, 4: HASHSHOW, 5: COPY, 6: REPLACE, 7: DELETE, 8: COUNTEND, 9: VOWEL, 10: CHANGE}

while True:
    o = int(input(">>>"))
    if o == 11:
        break
    elif o in options:
        options[o]()
    else:
        print("Invalid option")
```

Output:

```
        #-----------------------#
        |          rEee         |
        |   1. create           |
        |   2. display          |
        |   3. count characters |
        |   4. hash show        |
        |   5. copy             |
        |   6. replace          |
        |   7. delete           |
        |   8. count end        |
        |   9. vowel            |
        |  10. change           |
        |  11. exit             |
        |                       |
        #-----------------------#
>>>1
Enter number of lines: 2
1. asdf
2. fdsa
>>>2
asdf
fdsa

>>>3
{'v': 2, 'c': 6, 'u': 0, 'l': 8}
>>>4
asdf
fdsa
>>>5
>>>6
search: asdf
replace: qwre
{'Original text': 'asdf\nfdsa\n', 'Changed text': 'qwre\nfdsa\n'}
>>>7
Enter the word to delete: asdf
>>>2

fdsa

>>>8
{'count': 0}
>>>9
{'Original file': '\nfdsa\n', 'Vowel file': ''}
>>>10
{'Original text': '\nfdsa\n', 'Changed text': '\nfdsa\n'}
>>>11
>>>
```

FILE HANDLING – 2

BINARY FILES

Program 1

Aim: Write a function 'createb()' to create a binary file with entered details and 'Search()' to look for a specific employee

Modules used: pickle

Data types used: Int, Str, Dict, List

Script:

```
import pickle

def createb() -> None:
    d = {}
    try:
        with open("dump/Journal Files/bin/employees.dat", "wb") as f:
            for i in range(int(input("no. of employees: "))):
                k = eval(input(f"{i + 1}. "))
                d[k[0]] = k[1:]
            pickle.dump(d, f)
    except EOFError as e:
        pass

createb()
```

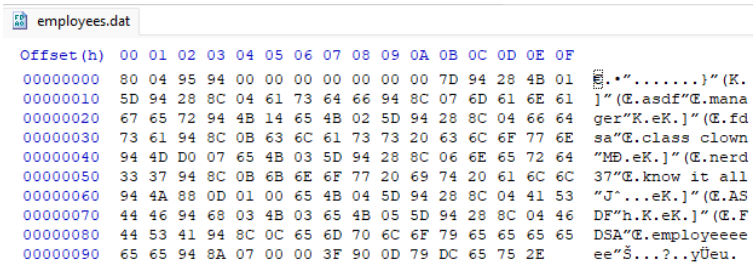
```
import pickle

def Search() -> None:
    with open("dump/Journal Files/bin/employees.dat", "rb") as f:
        d = pickle.load(f)

    eno = int(input(">>> "))

    if eno in d:
        n, de, s = d[eno]
        s = float(s)
        print(f"Employee details:\n\nName: {n} | Designation: {de} | Salary: {s}")
        if s < 20_000:
            d[eno][-1] = s + 2_000
            with open("dump/Journal Files/bin/employees.dat", "wb") as f:
                pickle.dump(d, f)
    else:
        print("Employee not found")

Search()
```

Output:

python (function 1):

```
no. of employees: 5
1. [1, "asdf", "manager", 20]
2. [2, "fdsa", "class clown", 2000]
3. [3, "nerd37", "know it all", 69_000]
4. [4, "ASDF", "manager", 3]
5. [5, "FDSA", "employeeeeee", -10000000000000000]
>>>
```

employee.dat (hex editor, function 1):



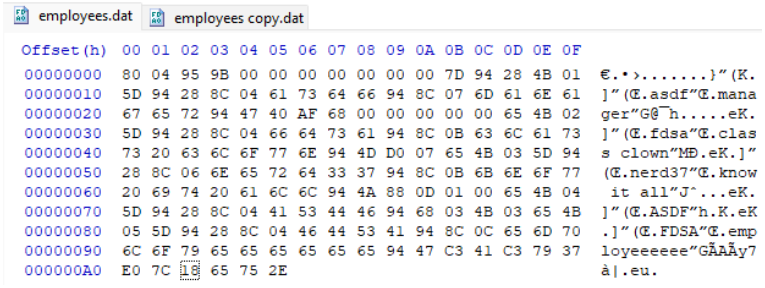
employees.dat

Offset(h)	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	
00000000	80	04	95	94	00	00	00	00	00	00	00	7D	94	28	4B	01	€.•”.......}”(K.
00000010	5D	94	28	8C	04	61	73	64	66	94	8C	07	6D	61	6E	61	]”(Œ.asdf”Œ.mana
00000020	67	65	72	94	4B	14	65	4B	02	5D	94	28	8C	04	66	64	ger”K.eK.]”(Œ.fd
00000030	73	61	94	8C	0B	63	6C	61	73	73	20	63	6C	6F	77	6E	sa”Œ.class clown
00000040	94	4D	D0	07	65	4B	03	5D	94	28	8C	06	6E	65	72	64	”MÐ.eK.]”(Œ.nerd
00000050	33	37	94	8C	0B	6B	6E	6F	77	20	69	74	20	61	6C	6C	37”Œ.know it all
00000060	94	4A	88	0D	01	00	65	4B	04	5D	94	28	8C	04	41	53	”Jˆ...eK.]”(Œ.AS
00000070	44	46	94	68	03	4B	03	65	4B	05	5D	94	28	8C	04	46	DF”h.K.eK.]”(Œ.F
00000080	44	53	41	94	8C	0C	65	6D	70	6C	6F	79	65	65	65	65	DSA”Œ.employeeee
00000090	65	65	94	8A	07	00	00	3F	90	0D	79	DC	65	75	2E		ee”Š...?..yÜeu.

python (function 2):

```
>>> 1
Employee details:

Name: asdf | Designation: manager | Salary: 2020.0
>>>
======================== RESTART: D:\Programming\SchoolS
>>> 5
Employee details:

Name: FDSA | Designation: employeeeeee | Salary: -1e+16
>>>
```

employee.dat (hex editor, function 2):



employees.dat | employees copy.dat

Offset(h)	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	
00000000	80	04	95	9B	00	00	00	00	00	00	00	7D	94	28	4B	01	€.•›.......}”(K.
00000010	5D	94	28	8C	04	61	73	64	66	94	8C	07	6D	61	6E	61	]”(Œ.asdf”Œ.mana
00000020	67	65	72	94	47	40	AF	68	00	00	00	00	00	65	4B	02	ger”G@¯h.....eK.
00000030	5D	94	28	8C	04	66	64	73	61	94	8C	0B	63	6C	61	73	]”(Œ.fdsa”Œ.clas
00000040	73	20	63	6C	6F	77	6E	94	4D	D0	07	65	4B	03	5D	94	s clown”MÐ.eK.]”
00000050	28	8C	06	6E	65	72	64	33	37	94	8C	0B	6B	6E	6F	77	(Œ.nerd37”Œ.know
00000060	20	69	74	20	61	6C	6C	94	4A	88	0D	01	00	65	4B	04	it all”Jˆ...eK.
00000070	5D	94	28	8C	04	41	53	44	46	94	68	03	4B	03	65	4B	]”(Œ.ASDF”h.K.eK
00000080	05	5D	94	28	8C	04	46	44	53	41	94	8C	0C	65	6D	70	.]”(Œ.FDSA”Œ.emp
00000090	6C	6F	79	65	65	65	65	65	65	94	47	C3	41	C3	79	37	loyeeeeee”GÃAÃy7
000000A0	E0	7C	18	65	75	2E											à|.eu.

Program 2

Aim: Write a function to insert data at the end of the file

Modules used: pickle

Data types used: Int, Str, Dict, List

Script:

```
import pickle

def f() -> None:
    with open("dump/Journal Files/bin/employees.dat", "rb") as f:
        d = pickle.load(f)

    for i in range(int(input("no. of new employees: "))):
        k = eval(input(f"{i + 1}. "))
        d[k[0]] = k[1:]

    with open("dump/Journal Files/bin/employees.dat", "wb") as f:
        pickle.dump(d, f)

f()
```

Output:

python:

```
no. of new employees: 1
1. [6, "nerd 75", "boss man", 75_000]
>>>
```

employee.dat (hex editor):

employees.dat | employees.dat.bak

```
Offset(h)  00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F

00000000   80 04 95 BB 00 00 00 00 00 00 00 7D 94 28 4B 01  €.•».......}”(K.
00000010   5D 94 28 8C 04 61 73 64 66 94 8C 07 6D 61 6E 61  ]”(Œ.asdf”Œ.mana
00000020   67 65 72 94 47 40 AF 68 00 00 00 00 00 65 4B 02  ger”G@¯h.....eK.
00000030   5D 94 28 8C 04 66 64 73 61 94 8C 0B 63 6C 61 73  ]”(Œ.fdsa”Œ.clas
00000040   73 20 63 6C 6F 77 6E 94 4D D0 07 65 4B 03 5D 94  s clown”MÐ.eK.]”
00000050   28 8C 06 6E 65 72 64 33 37 94 8C 0B 6B 6E 6F 77  (Œ.nerd37”Œ.know
00000060   20 69 74 20 61 6C 6C 94 4A 88 0D 01 00 65 4B 04   it all”Jˆ...eK.
00000070   5D 94 28 8C 04 41 53 44 46 94 68 03 4B 03 65 4B  ]”(Œ.ASDF”h.K.eK
00000080   05 5D 94 28 8C 04 46 44 53 41 94 8C 0C 65 6D 70  .]”(Œ.FDSA”Œ.emp
00000090   6C 6F 79 65 65 65 65 65 65 94 47 C3 41 C3 79 37  loyeeeeee”GÃAÃy7
000000A0   E0 7C 18 65 4B 06 5D 94 28 8C 07 6E 65 72 64 20  à|.eK.]”(Œ.nerd
000000B0   37 35 94 8C 08 62 6F 73 73 20 6D 61 6E 94 4A F8  75”Œ.boss man”Jø
000000C0   24 01 00 65 75 2E                               $..eu.
```

Program 3

Aim: Split `employee.dat` into two files, one with managers & the other with employees

Modules used: pickle

Data types used: Int, Str, Dict, List

Script:

```
import pickle

def split() -> None:
    with open("dump/Journal Files/bin/employees.dat", "rb") as f1, \
         open("dump/Journal Files/bin/manager.dat", "ab") as f2, \
         open("dump/Journal Files/bin/accountant.dat", "ab") as f3:

        d = pickle.load(f1)
        x = {}

        for k, v in d.items():
            de = v[1].lower()
            if de == "manager":
                pickle.dump({k: v}, f2)
            elif de == "accountant":
                pickle.dump({k: v}, f3)
            else:
                x[k] = v

    with open("dump/Journal Files/bin/employees.dat", "wb") as f1:
        pickle.dump(x, f1)

split()
```

Output:

python – no output

employee.dat (hex editor):

employees.dat | manager.dat | accountant.dat | employees.dat.bak

```
Offset(h)  00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
00000000   80 04 95 8A 00 00 00 00 00 00 00 7D 94 28 4B 02  €.•Š.......}”(K.
00000010   5D 94 28 8C 04 66 64 73 61 94 8C 0B 63 6C 61 73  ]”(Œ.fdsa”Œ.clas
00000020   73 20 63 6C 6F 77 6E 94 4D D0 07 65 4B 03 5D 94  s clown”MÐ.eK.]”
00000030   28 8C 06 6E 65 72 64 33 37 94 8C 0B 6B 6E 6F 77  (Œ.nerd37”Œ.know
00000040   20 69 74 20 61 6C 6C 94 4A 88 0D 01 00 65 4B 05   it all”Jˆ...eK.
00000050   5D 94 28 8C 04 46 44 53 41 94 8C 0C 65 6D 70 6C  ]”(Œ.FDSA”Œ.empl
00000060   6F 79 65 65 65 65 65 65 94 47 C3 41 C3 79 37 E0  oyeeeeee”GÃAÃy7à
00000070   7C 18 65 4B 06 5D 94 28 8C 07 6E 65 72 64 20 37  |.eK.]”(Œ.nerd 7
00000080   35 94 8C 08 62 6F 73 73 20 6D 61 6E 94 4A F8 24  5”Œ.boss man”Jø$
00000090   01 00 65 75 2E                                   ..eu.
```

manager.dat (hex editor):

employees.dat | manager.dat | accountant.dat | employees.dat.bak

```
Offset(h)  00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
00000000   80 04 95 24 00 00 00 00 00 00 00 7D 94 4B 01 5D  €.•$.......}”K.]
00000010   94 28 8C 04 61 73 64 66 94 8C 07 6D 61 6E 61 67  ”(Œ.asdf”Œ.manag
00000020   65 72 94 47 40 AF 68 00 00 00 00 00 65 73 2E 80  er”G@¯h.....es.€
00000030   04 95 1D 00 00 00 00 00 00 00 7D 94 4B 04 5D 94  .•........}”K.]”
00000040   28 8C 04 41 53 44 46 94 8C 07 6D 61 6E 61 67 65  (Œ.ASDF”Œ.manage
00000050   72 94 4B 03 65 73 2E                              r”K.es.
```

Program 4

Aim: Write a menu driven program to perform operations on a file

Modules used: pickle

Data types used: Int, Str, Dict, List

Script:

```
import pickle

print("""
#--------------------------------#
|              rEee              |
|  1.  CREATE                    |
|  2.  DISPLAY                   |
|  3.  SEARCH BY NAME            |
|  4.  SEARCH BY ROLL            |
|  5.  APPEND                    |
|  6.  COUNT & AVERAGE           |
|  7.  HIGHEST > 90 -> HIGH.DAT  |
|  8.  MODIFY MARKS < 23         |
|  9.  DELETE HOUSE 'EMERALD'    |
|  10. DELETE BY ROLL            |
|  11. EXIT                      |
#--------------------------------#""")

def create() -> None:
    with open("dump/Journal Files/bin/student.dat", "wb") as f:
        for i in range(int(input("no. of students: "))):
            t = eval(input(f"{i+1}. "))
            pickle.dump(t, f)

def display() -> None:
    with open("dump/Journal Files/bin/student.dat", "rb") as f:
        try:
            while True:
                print(pickle.load(f))
        except EOFError:
            pass

def searchname() -> None:
    name = input(">>> ").lower()
    found = False
    with open("dump/Journal Files/bin/student.dat", "rb") as f:
        try:
            while True:
                t = pickle.load(f)
                if t[1].lower() == name:
                    print(t)
                    found = True
        except EOFError:
            if not found:
                print("Record not found")

def searchid() -> None:
    roll = int(input("Enter roll to search: "))
    found = False
    with open("dump/Journal Files/bin/student.dat", "rb") as f:
        try:
            while True:
                t = pickle.load(f)
                if t[0] == roll:
                    print(t)
                    found = True
        except EOFError:
            if not found:
                print("Record not found.")

def append() -> None:
    with open("dump/Journal Files/bin/student.dat", "ab") as f:
        for i in range(int(input("No. of new records: "))):
            rec = eval(input(f"{i + 1}. "))
            pickle.dump(rec, f)

def count() -> None:
    total = 0
    _sum = 0
    with open("dump/Journal Files/bin/student.dat", "rb") as f:
        try:
            while True:
                t = pickle.load(f)
                total += 1
                _sum += t[2]
        except EOFError:
            pass
    print(f"Total records: {total}")
    if total > 0:
        print(f"Avg marks: {_sum / total:.2f}")

def highest() -> None:
    with open("dump/Journal Files/bin/student.dat", "rb") as fin, open("dump/Journal Files/bin/high.dat", "wb") as fout:
        try:
            while True:
                t = pickle.load(fin)
                if t[2] > 90:
                    pickle.dump(t, fout)
        except EOFError:
            pass

def modify() -> None:
    records = []
    with open("dump/Journal Files/bin/student.dat", "rb") as f:
        try:
            while True:
                rec = pickle.load(f)
                if rec[2] < 23:
                    rec[2] += 10
                records.append(rec)
        except EOFError:
            pass
    with open("dump/Journal Files/bin/student.dat", "wb") as f:
        for rec in records:
            pickle.dump(rec, f)

def delete() -> None:
    records = []
    with open("dump/Journal Files/bin/student.dat", "rb") as f:
        try:
            while True:
                rec = pickle.load(f)
                if rec[-1].lower() != "emerald":
                    records.append(rec)
        except EOFError:
            pass
    with open("dump/Journal Files/bin/student.dat", "wb") as f:
        for rec in records:
            pickle.dump(rec, f)

def deleteroll() -> None:
    roll = int(input("Enter roll to delete: "))
    found = False
    records = []
    with open("dump/Journal Files/bin/student.dat", "rb") as f:
        try:
            while True:
                rec = pickle.load(f)
                if rec[0] == roll:
                    found = True
                else:
                    records.append(rec)
        except EOFError:
            pass
    if found:
        with open("dump/Journal Files/bin/student.dat", "wb") as f:
            for rec in records:
                pickle.dump(rec, f)
        print("Record deleted, *poof*")
    else:
        print("Record not found")

while (o := int(input(">>> "))) != 11: [create, display, searchname, searchid, append, count, highest, modify, delete, deleteroll][o - 1]() if 1 <= o <= 10 else print("Invalid option")
```

Output:

```
#--------------------------------#
|              rEee              |
|  1.  CREATE                    |
|  2.  DISPLAY                   |
|  3.  SEARCH BY NAME            |
|  4.  SEARCH BY ROLL            |
|  5.  APPEND                    |
|  6.  COUNT & AVERAGE           |
|  7.  HIGHEST > 90 -> HIGH.DAT  |
|  8.  MODIFY MARKS < 23         |
|  9.  DELETE HOUSE 'EMERALD'    |
|  10. DELETE BY ROLL            |
|  11. EXIT                      |
#--------------------------------#
>>> 1
no. of students: 3
1. [1, "asdf", 4, "emerald"]
2. [2, "nerd 5", 100, "ruby"]
3. [7, "fdsa", 32, "the blue one"]
>>> 2
[1, 'asdf', 4, 'emerald']
[2, 'nerd 5', 100, 'ruby']
[7, 'fdsa', 32, 'the blue one']
>>> 3
>>> asdf
[1, 'asdf', 4, 'emerald']
>>> 4
Enter roll to search: 7
[7, 'fdsa', 32, 'the blue one']
>>> 5
No. of new records: 1
1. [6, "ASDF", 5, "emerald"]
>>> 6
Total records: 4
Avg marks: 35.25
>>> 7
>>> 8
>>> 9
>>> 2
[2, 'nerd 5', 100, 'ruby']
[7, 'fdsa', 32, 'the blue one']
>>> 10
Enter roll to delete: 7
Record deleted, *poof*
>>> 2
[2, 'nerd 5', 100, 'ruby']
>>> 11
>>>
```

FILE HANDLING – 3

CSV FILES

Program 1

Aim: Write a menu driven program to perform operations on a file

Modules used: csv

Data types used: Int, Str, List

Script:

```
from csv import writer as wr, reader as re

k = []
def _load():
    global k
    k.clear()
    with open("dump/Journal Files/csv/toy.csv", "r", newline="") as f:
        for i , j in enumerate(re(f)):
            if i == 0:
                continue
            k.append(j)

def CREATE():
    with open("dump/Journal Files/csv/toy.csv", "w", newline="") as f:
        w = wr(f)
        w.writerow(["NAME", "PRICE", "CATEGORY", "STK"])
        for i in range(int(input("number of records: "))):
            w.writerow(eval(input(f"{i + 1}. ")))
    _load()

def DISPLAY():
    with open("dump/Journal Files/csv/toy.csv", "r", newline="") as f:
        for i , j in enumerate(re(f)):
            if i == 0:
                print(f"{j[0]:^20} | {j[1]:^10} | {j[2]:^10} | {j[3]:^10}")
                print("-"*60)
                continue
            print(f"{j[0]:<20} | {j[1]:^10} | {j[2]:^10} | {j[3]:^10}")
    print()

def SEARCH():
    t = input("search term: ").lower()
    for i in k:
        if i[0].lower() == t:
            print("        NAME          |   PRICE    | CATEGORY |    STK    ")
            print(f"{i[0]:<20} | {i[1]:^10} | {i[2]:^10} | {i[3]:^10}")
            print()
            return
    print("Record not found")
    print()

def APPEND():
    with open("dump/Journal Files/csv/toy.csv", "a", newline="") as f:
        w = wr(f)
        for i in range(int(input("number of records: "))):
            w.writerow(eval(input(f"{i + 1}. ")))
    _load()

def HIGHEST():
    _load()
    l = []
    with open("dump/Journal Files/csv/highest.csv", "w", newline="") as f:
        for i in k:
            if int(i[1]) > 100:
                l.append(i)
        w = wr(f)
        w.writerow(["NAME", "PRICE", "CATEGORY", "STK"])
        w.writerows(l)
    print("\nMoved items that cost more than 100 into highest.csv")
```

```
def MODIFY():
    _load()
    l = []
    for i in k:
        if int(i[-1]) < 10:
            i[-1] = int(i[-1]) + 10
        l.append(i)
    with open("dump/Journal Files/csv/toy.csv", "w", newline="") as f:
        w = wr(f)
        w.writerow(["NAME", "PRICE", "CATEGORY", "STK"])
        w.writerows(l)
    _load()
    print("\nAdded 10 to stock where needed")

def DELETE():
    _load()
    global k
    l = k.copy()
    k.clear()
    for i in l:
        if i[-2] == "FUN":
            continue
        k.append(i)
    with open("dump/Journal Files/csv/toy.csv", "w", newline="") as f:
        w = wr(f)
        w.writerow(["NAME", "PRICE", "CATEGORY", "STK"])
        w.writerows(k)
    _load()
    print("\nPurged fun :P")


CREATE()
print("""
#------------------#
|       rEee       |
|  1.  DISPLAY     |
|  2.  SEARCH      |
|  3.  APPEND      |
|  4.  HIGHEST     |
|  5.  MODIFY      |
|  6.  DELETE      |
|  7.  EXIT        |
#------------------#""")
while (o := int(input(">>> "))) != 7: [DISPLAY, SEARCH, APPEND, HIGHEST, MODIFY, DELETE][o - 1]() if 1 <= o <= 6 else print("Invalid option")
```

Output:

```
number of records: 6
1. ["BUILDING BLOCKS", 45, "EDU", 34]
2. ["LEARNING SCIENCE", 156, "JUNIOR", 5]
3. ["CAR", 134, "FUN", 56]
4. ["ABASCUS", 78, "EDU", 12]
5. ["REMOTE DRONE", 200, "FUN", 7]
6. ["BIKE", 80, "JUNIOR", 28]

#------------------#
|       rEee       |
|  1.  DISPLAY     |
|  2.  SEARCH      |
|  3.  APPEND      |
|  4.  HIGHEST     |
|  5.  MODIFY      |
|  6.  DELETE      |
|  7.  EXIT        |
#------------------#
>>> 1
        NAME          |   PRICE    |  CATEGORY  |    STK
------------------------------------------------------------
BUILDING BLOCKS       |     45     |    EDU     |     34
LEARNING SCIENCE      |    156     |   JUNIOR   |     5
CAR                   |    134     |    FUN     |     56
ABASCUS               |     78     |    EDU     |     12
REMOTE DRONE          |    200     |    FUN     |     7
BIKE                  |     80     |   JUNIOR   |     28

>>> 2
search term: bike
        NAME          |   PRICE    |  CATEGORY  |    STK
BIKE                  |     80     |   JUNIOR   |     28

>>> 3
number of records: 1
1. ["LEGO", 100000, "FUN", 2]
>>> 4

Moved items that cost more than 100 into highest.csv
>>> 5

Added 10 to stock where needed
>>> 6

Purged fun :P
>>> 1
        NAME          |   PRICE    |  CATEGORY  |    STK
------------------------------------------------------------
BUILDING BLOCKS       |     45     |    EDU     |     34
LEARNING SCIENCE      |    156     |   JUNIOR   |     15
ABASCUS               |     78     |    EDU     |     12
BIKE                  |     80     |   JUNIOR   |     28

>>> 7
>>>
```

Program 2

Aim: Write a menu driven program to perform operations on a file

Modules used: csv

Data types used: Int, Str, List

Script:

```
from csv import writer as wr, reader as re

k = []
def _load():
    global k
    k.clear()
    with open("dump/Journal Files/csv/student.csv", "r", newline="") as f:
        for i , j in enumerate(re(f)):
            if i == 0:
                continue
            k.append(j)

def CREATE():
    with open("dump/Journal Files/csv/student.csv", "w", newline="") as f:
        w = wr(f)
        w.writerow(["name", "engmark", "csmark", "phymark", "chemmark", "mathmark"])
        for i in range(int(input("number of records: "))):
            w.writerow(eval(input(f"{i + 1}. ")))
    _load()

def DISPLAY():
    with open("dump/Journal Files/csv/student.csv", "r", newline="") as f:
        for i , j in enumerate(re(f)):
            if i == 0:
                print(f"{j[0]:^20} | {j[1]:^5} | {j[2]:^5} | {j[3]:^5} | {j[4]:^5} | {j[5]:^5}")
                print("-"*61)
                continue
            print(f"{j[0]:^20} | {j[1]:^5} | {j[2]:^5} | {j[3]:^5} | {j[4]:^5} | {j[5]:^5}")
    print()

def APPEND():
    with open("dump/Journal Files/csv/student.csv", "a", newline="") as f:
        w = wr(f)
        for i in range(int(input("number of records: "))):
            w.writerow(eval(input(f"{i + 1}. ")))
    _load()

def FAILURE():
    _load()
    x = []
    for i in k:
        if float(i[1]) > 26.5 and float(i[-1]) > 26.5 and all(float(x) > 23.5 for x in i[2:-1]):
            x.append(i)
    with open("dump/Journal Files/csv/fail.csv", "w") as f:
        for i in x:
            f.write(f"{i[0]}\n")
    print("Moved names of failures into fail.txt")
```

```
def MODIFY():
    _load()
    global k
    l = k.copy()
    k.clear()
    for i in l:
        if int(i[2]) < 50:
            i[2] = int(i[2]) + 10
        k.append(l)
    with open("dump/Journal Files/csv/student.csv", "w", newline="") as f:
        w = wr(f)
        w.writerow(["name", "engmark", "csmark", "phymark", "chemmark", "mathmark"])
        w.writerows(k)
    _load()
    print("added 10 to students that got below 50 in cs")

def DELETE():
    _load()
    l = k.copy()
    k.clear()
    for i in l:
        if sum([int(x) for x in i[1:]])/5 < 0.4:
            continue
        k.append(i)
    with open("dump/Journal Files/csv/student.csv", "w", newline="") as f:
        w = wr(f)
        w.writerow(["name", "engmark", "csmark", "phymark", "chemmark", "mathmark"])
        w.writerows(k)
    _load()
    print("evicerated records")


CREATE()
print("""
#------------------#
|       rEee       |
|  1.  DISPLAY     |
|  2.  APPEND      |
|  3.  FAILURE     |
|  4.  MODIFY      |
|  5.  DELETE      |
|  6.  EXIT        |
#------------------#""")
while (o := int(input(">>> "))) != 6: [DISPLAY, APPEND, FAILURE, MODIFY, DELETE][o - 1]() if 1 <= o <= 5 else print("Invalid option")
```

Output:

```
number of records: 3
1. ["nerd 24.7", 100, 100, 100, 100, 100]
2. ["asdf", 2, -1, 0.5, 99, 79]
3. ["fdsa", 33, 21, 40, 22, 30]

#------------------#
|       rEee       |
|  1.  DISPLAY     |
|  2.  APPEND      |
|  3.  FAILURE     |
|  4.  MODIFY      |
|  5.  DELETE      |
|  6.  EXIT        |
#------------------#
>>> 1
        name         | engmark | csmark | phymark | chemmark | mathmark
-------------------------------------------------------------------
     nerd 24.7       |  100    |  100   |  100    |  100     |  100
        asdf         |   2     |  -1    |  0.5    |  99      |  79
        fdsa         |  33     |  21    |  40     |  22      |  30

>>> 2
number of records: 1
1. ["rEee", 99, 99, 99, 99, 90]
>>> 3
Moved names of failures into fail.txt
>>> 4
added 10 to students that got below 50 in cs
>>> 5
evicerated records
>>> 6
```

Program 3

Aim: Write a function Accept() and wonCount() to accept records and count number of wins

Modules used: csv

Data types used: Int, Str, List

Script:

```
from csv import writer as wr, reader as re

def Accept():
    with open("dump/Journal Files/csv/Result.csv", "a", newline='') as f:
        w = wr(f)
        f.seek(0, 2)
        if f.tell() == 0:
            w.writerow(["St_Id", "St_Name", "Game_Name", "Result"])

        n = int(input("number of records: "))
        for i in range(n):
            w.writerow(eval(input(f"{i + 1}. ")))

def wonCount():
    cnt = 0
    with open("dump/Journal Files/csv/Result.csv", newline='') as f:
        r = re(f)
        next(r, None)
        for row in r:
            if row[3].strip().lower() == 'won':
                cnt += 1
    print(f"No. of wins: {cnt}")

Accept()
print()
wonCount()
```

Output:

```
number of records: 3
1. [-3, "asdf", "expedition 34", "Won"]
2. [2, "nerd 932", "lies of p(eak)", "Loss"]
3. [449, "fdsa", "Old ring Day Hail", "Tie"]

No. of wins: 2
>>>
```

STACKS

Program 1

Aim: Write a menu driven program to perform stack operations on a stack of train data

Modules used: N/A

Data types used: Int, Str, List, Tuple

Script:

```
trains = eval(input(">>> "))
top = None

def updateTop(): global top; top = len(trains) -1

def display():
    updateTop()
    for i in range(top, -1, -1):
        print(trains[i])

def pop():
    global trains
    if len(trains) == 0:
        print("Stack underflow")
        return None
    else:
        k = trains.pop()
        updateTop()
        return k

def push():
    global trains; trains.append(eval(input(">>> ")))
    updateTop()

def peek():
    if len(trains) == 0:
        print("Stack Underflow")
    else:
        updateTop()
        print(trains[top])


print("""
#------------------#
|       rEee       |
|  1.  Display     |
|  2.  Push        |
|  3.  Pop         |
|  4.  Peek        |
|  5.  Exit        |
#------------------#""")

while (o := int(input(">>> "))) != 5: [display, push, pop, peek][o - 1]() if 1 <= o <= 4 else print("Invalid option")
```

Output:

```
>>> [(1, "asdf"), (2, "fdsa")]

#------------------#
|       rEee       |
|  1.  Display     |
|  2.  Push        |
|  3.  Pop         |
|  4.  Peek        |
|  5.  Exit        |
#------------------#
>>> 1
(2, 'fdsa')
(1, 'asdf')
>>> 2
>>> (3, "fast train")
>>> 1
(3, 'fast train')
(2, 'fdsa')
(1, 'asdf')
>>> 4
(3, 'fast train')
>>> 3
>>> 1
(2, 'fdsa')
(1, 'asdf')
>>> 5
>>>
```

Program 2

Aim: Write a program with user defined functions to perform stack operations on a stack of product data

Modules used: N/A

Data types used: Int, Str, List

Script:

```
Product = eval(input(">>> "))
stk = []
top = None

def updateTop() -> None: global top; top = len(stk) - 1

def push() -> None:
    for k, v in Product.items():
        if 5000 <= v and v <= 25000:
            stk.append(k)
    updateTop()

def pop():
    global stk
    if len(stk) == 0:
        print("Stack underflow")
        return None
    else:
        k = stk.pop()
        updateTop()
        return k


push()

while len(stk) != 0:
    print(pop(), end=" ")
```

Output:

```
>>> {'TV':20000, 'Mobile':19999, 'Camera':4999, 'Printer':5999, 'Mouse':499, 'Keyboard':600, 'AC':25000}
AC Printer Mobile TV
>>>
```

Program 3

Aim: Write a program with user defined functions to perform stack operations on a stack of student data

Modules used: N/A

Data types used: Int, Str, List

Script:

```
Students = eval(input(">>> "))

stk = []
top = None

def updateTop() -> None: global top; top = len(stk) - 1

def push() -> None:
    for k, v in Students.items():
        if v[0] in "Aa":
            stk.append(k)
    updateTop()

def pop():
    global stk
    if len(stk) == 0:
        print("Stack underflow")
        return None
    else:
        k = stk.pop()
        updateTop()
        return k


push()

while len(stk) != 0:
    print(pop(), end=" ")
```

Output:

```
>>> {'S001':'asdf', 'S002':'fdsa', 'S003':'Asdf', 'S004':'nerd 254', 'S005':'rEee', 'S006':'abcd'}
S006 S003 S001
>>>
```

Program 4

Aim: Write a program with user defined functions to perform stack operations on a stack of integers

Modules used: N/A

Data types used: Int, Str, List

Script:

```
n = eval(input(">>> "))

stk = []
top = None

def updateTop() -> None: global top; top = len(stk) - 1

def push() -> None:
    for i in n:
        if i%2 == 0:
            stk.append(i)
    updateTop()

def pop():
    global stk
    if len(stk) == 0:
        print("Stack underflow")
        return None
    else:
        k = stk.pop()
        updateTop()
        return k


push()

while len(stk) != 0:
    print(pop(), end=" ")
```

Output:

```
>>> [0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
8 6 4 2 0
>>>
```

MySQL

Program 1

Aim: Perform operations on a MySQL database

Data types used: Int, Char, Varchar, Decimal

Query & Output:

```
mysql> -- 1
mysql> select name, seatno from passengers where class = 'II' and age > 18;
+-------+--------+
| name  | seatno |
+-------+--------+
| anu   |     11 |
| ankul |      6 |
+-------+--------+
2 rows in set (0.00 sec)

mysql> -- 2
mysql> select tno, class from passengers where fare between 900 and 1300;
+------+----------+
| tno  | class    |
+------+----------+
| 1103 | AC-CHAIR |
| 2019 | AC-I     |
| 3012 | AC-II    |
+------+----------+
3 rows in set (0.00 sec)

mysql> -- 3
mysql> select * from passengers order by age asc;
+-----+--------+------+----------+--------+------+------+
| pno | name   | tno  | class    | seatno | age  | fare |
+-----+--------+------+----------+--------+------+------+
|   7 | priya  | 3012 | AC-II    |      2 |   11 | 1200 |
|   4 | gaurav | 2011 | II       |     23 |   17 |  700 |
|   3 | samir  | 2019 | AC-I     |     78 |   18 |  900 |
|   6 | ankul  | 1101 | II       |      6 |   20 |  500 |
|   1 | anu    | 1101 | II       |     11 |   25 |  700 |
|   5 | kripal | 1893 | I        |      3 |   25 | 1700 |
|   2 | sagar  | 1103 | AC-CHAIR |     34 |   43 | 1300 |
+-----+--------+------+----------+--------+------+------+
7 rows in set (0.00 sec)

mysql> -- 4
mysql> select name, fare, fare * 1.10 as newfare from passengers;
+--------+------+---------+
| name   | fare | newfare |
+--------+------+---------+
| anu    |  700 |  770.00 |
| sagar  | 1300 | 1430.00 |
| samir  |  900 |  990.00 |
| gaurav |  700 |  770.00 |
| kripal | 1700 | 1870.00 |
| ankul  |  500 |  550.00 |
| priya  | 1200 | 1320.00 |
+--------+------+---------+
7 rows in set (0.00 sec)
```

```
mysql> -- 5
mysql> insert into passengers values(9, 'ajay',2011, 'ii',19,20,500);
Query OK, 1 row affected (0.00 sec)

mysql> -- 6
mysql> select concat(name, ' is ',age, ' years old') as details from passengers;
+-----------------------+
| details               |
+-----------------------+
| anu is 25 years old   |
| sagar is 43 years old |
| samir is 18 years old |
| gaurav is 17 years old |
| kripal is 25 years old |
| ankul is 20 years old |
| priya is 11 years old |
| ajay is 20 years old  |
+-----------------------+
8 rows in set (0.00 sec)

mysql> -- 7
mysql> select tno, name from passengers where fare < 1200 order by fare, name desc;
+------+--------+
| tno  | name   |
+------+--------+
| 1101 | ankul  |
| 2011 | ajay   |
| 2011 | gaurav |
| 1101 | anu    |
| 2019 | samir  |
+------+--------+
5 rows in set (0.00 sec)

mysql> -- 8
mysql> update passengers set fare = fare-50 where name like '_r%a';
Query OK, 1 row affected (0.01 sec)
Rows matched: 1  Changed: 1  Warnings: 0
```

Program 2

Aim: Perform operations on a MySQL database

Data types used: Int, Char, Varchar, Decimal

Query & Output:

```
mysql> -- 1
mysql> select shopname from shop where area = 'south' and c_perc < 75;
+----------+
| shopname |
+----------+
| crystal  |
+----------+
1 row in set (0.00 sec)

mysql> -- 2
mysql> select distinct city from shop where city like '__l%i';
+-------+
| city  |
+-------+
| delhi |
+-------+
1 row in set (0.00 sec)

mysql> -- 3
mysql> select * from shop where sale > 300000 order by shopname desc;
+----+-------------+--------+-------+--------+--------+--------+
| no | shopname    | sale   | area  | c_perc | rating | city   |
+----+-------------+--------+-------+--------+--------+--------+
|  4 | ripple      | 380000 | north |  88.00 | b      | mumbai |
|  2 | dharohar    | 500000 | south |  81.80 | a      | mumbai |
|  5 | best stores | 456000 | east  |   NULL | a      | delhi  |
+----+-------------+--------+-------+--------+--------+--------+
3 rows in set (0.00 sec)

mysql> -- 4
mysql> select shopname, area, rating from shop where sale between 350000 and 400000;
+----------+-------+--------+
| shopname | area  | rating |
+----------+-------+--------+
| ripple   | north | b      |
+----------+-------+--------+
1 row in set (0.00 sec)

mysql> -- 5
mysql> select * from shop where rating = 'a';
+----+-------------+--------+-------+--------+--------+----------+
| no | shopname    | sale   | area  | c_perc | rating | city     |
+----+-------------+--------+-------+--------+--------+----------+
|  2 | dharohar    | 500000 | south |  81.80 | a      | mumbai   |
|  5 | best stores | 456000 | east  |   NULL | a      | delhi    |
|  6 | crystal     | 290000 | south |  66.70 | a      | kolkatta |
+----+-------------+--------+-------+--------+--------+----------+
3 rows in set (0.00 sec)
```

```
mysql> -- 6
mysql> select shopname from shop where c_perc is null;
+-------------+
| shopname    |
+-------------+
| best stores |
+-------------+
1 row in set (0.00 sec)

mysql> -- 7
mysql> select shopname, city from shop where city in ('mumbai', 'delhi');
+-------------+--------+
| shopname    | city   |
+-------------+--------+
| s.m. sons   | delhi  |
| dharohar    | mumbai |
| ripple      | mumbai |
| best stores | delhi  |
+-------------+--------+
4 rows in set (0.00 sec)

mysql> -- 8
mysql> select shopname, 'is in', city from shop where shopname not like '%t_r%';
+-----------+-------+----------+
| shopname  | is in | city     |
+-----------+-------+----------+
| s.m. sons | is in | delhi    |
| dharohar  | is in | mumbai   |
| kriti art | is in | kolkatta |
| ripple    | is in | mumbai   |
| crystal   | is in | kolkatta |
+-----------+-------+----------+
5 rows in set (0.00 sec)
```

Program 3

Aim: Perform operations on a MySQL database

Data types used: Int, Char, Varchar, Decimal

Query & Output:

```
mysql> -- 1
mysql> select name from graduate where `div` = 1 order by name;
+---------+
| name    |
+---------+
| arun    |
| divakar |
| karan   |
| sabina  |
+---------+
4 rows in set (0.00 sec)

mysql> -- 2
mysql> select name, stipend, subject, stipend * 12 as 'annual stipend' from graduate;
+---------+---------+-------------+----------------+
| name    | stipend | subject     | annual stipend |
+---------+---------+-------------+----------------+
| karan   |     400 | physics     |           4800 |
| divakar |     450 | computer sci |           5400 |
| divya   |     300 | chemistry   |           3600 |
| arun    |     350 | physics     |           4200 |
| sabina  |     500 | maths       |           6000 |
+---------+---------+-------------+----------------+
5 rows in set (0.00 sec)

mysql> -- 3
mysql> select count(*) from graduate where subject in ('physics', 'chemistry');
+----------+
| count(*) |
+----------+
|        3 |
+----------+
1 row in set (0.00 sec)

mysql> -- 4
mysql> insert into graduate values(6, 'nerd 51', 400, 'comp. sci', 100, 1);
Query OK, 1 row affected (0.00 sec)

mysql> -- 5
mysql> update graduate set stipend = stipend + 100 where `div` = 1;
Query OK, 5 rows affected (0.00 sec)
Rows matched: 5  Changed: 5  Warnings: 0
```

```
mysql> -- 6
mysql> select name, advisor from graduate, guide where graduate.subject = guide.mainstream;
+---------+---------+
| name    | advisor |
+---------+---------+
| karan   | vinod   |
| divakar | mahesh  |
| divya   | alok    |
| arun    | vinod   |
| sabina  | rajan   |
+---------+---------+
5 rows in set (0.00 sec)

mysql> -- 7
mysql> select avg(stipend) from graduate where average >= 65;
+--------------+
| avg(stipend) |
+--------------+
|     537.5000 |
+--------------+
1 row in set (0.00 sec)
```

Program 4

Aim: Perform operations on a MySQL database

Data types used: Int, Char, Varchar, Decimal

Query & Output:

```
mysql> -- 1
mysql> select * from consumer where address = 'delhi';
+------+--------------+---------+------+
| c_id | consumername | address | s_id |
+------+--------------+---------+------+
|    1 | good learner | delhi   | pl01 |
|   12 | topper       | delhi   | dp01 |
+------+--------------+---------+------+
2 rows in set (0.00 sec)

mysql> -- 2
mysql> select * from stationary where price between 8 and 15;
+------+----------------+---------+-------+
| s_id | stationaryname | company | price |
+------+----------------+---------+-------+
| dp01 | dot pen        | abc     |    10 |
+------+----------------+---------+-------+
1 row in set (0.00 sec)

mysql> -- 3
mysql> update stationary set price = price + 2;
Query OK, 4 rows affected (0.00 sec)
Rows matched: 4  Changed: 4  Warnings: 0

mysql> -- 4
mysql> select consumername, address, company, price from consumer, stationary where consumer.s_id = stationary.s_id;
+--------------+---------+---------+-------+
| consumername | address | company | price |
+--------------+---------+---------+-------+
| good learner | delhi   | cam     |     7 |
| write well   | mumbai  | xyz     |     9 |
| topper       | delhi   | abc     |    12 |
+--------------+---------+---------+-------+
3 rows in set (0.00 sec)

mysql> -- 5
mysql> delete from consumer where s_id in (select s_id from stationary where company = 'xyz');
Query OK, 1 row affected (0.00 sec)

mysql> delete from stationary where company = 'xyz';
Query OK, 2 rows affected (0.00 sec)

mysql> -- 6
mysql> alter table consumer add state varchar(30);
Query OK, 0 rows affected (0.01 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

```
mysql> -- 7
mysql> select distinct address from consumer;
+---------+
| address |
+---------+
| delhi   |
+---------+
1 row in set (0.00 sec)

mysql> -- 8
mysql> select company, max(price), min(price), count(*) from stationary group by company;
+---------+-------------+-------------+----------+
| company | max(price) | min(price) | count(*) |
+---------+-------------+-------------+----------+
| abc     |          12 |          12 |        1 |
| cam     |           7 |           7 |        1 |
+---------+-------------+-------------+----------+
2 rows in set (0.00 sec)
```

MySQL Connectivity

Program 1

Aim: Write a menu driven python program to perform operations on a MySQL database

Modules used: `mysql.connector`

Data types used: Int, Str, List

Script:

```
import mysql.connector

conn = mysql.connector.connect(host='127.0.0.1', user='root', password='root', database='journal')
cursor = conn.cursor()


def f(x) -> None:
    cursor.execute(x)
    [print(i) for i in cursor.fetchall()]


print("""
        #----------------------------#
        |            rEee            |
        |   1. coach starts with 'K' |
        |   2. new -> old            |
        |   3. age b/w 15 & 25       |
        |   4. exit                  |
        #----------------------------#""")

while True:
    o = int(input(">>> "))
    if o == 1:
        f("select code, name, c_name from club where c_name like 'k%'")
    elif o == 2:
        f("select * from club order by `date of application` desc")
    elif o == 3:
        f("select * from club where age between 15 and 25")
    elif o == 4:
        break
    else:
        print("Invalid option.")

cursor.close()
conn.close()
```

Output:

```
        #----------------------------#
        |            rEee            |
        |   1. coach starts with 'K' |
        |   2. new -> old            |
        |   3. age b/w 15 & 25       |
        |   4. exit                  |
        #----------------------------#
>>> 1
(1, 'asdf', 'kenz')
(3, 'nerd91', 'kenzie')
>>> 2
(1, 'asdf', 17, datetime.date(2025, 4, 11), 'kenz')
(2, 'fdsa', 18, datetime.date(2025, 2, 21), 'not kenz')
(3, 'nerd91', 15, datetime.date(2021, 1, 1), 'kenzie')
>>> 6
Invalid option.
>>> 3
(1, 'asdf', 17, datetime.date(2025, 4, 11), 'kenz')
(2, 'fdsa', 18, datetime.date(2025, 2, 21), 'not kenz')
(3, 'nerd91', 15, datetime.date(2021, 1, 1), 'kenzie')
>>> 4
>>>
```

Program 2

Aim: Write a menu driven python program to perform operations on a MySQL database

Modules used: `mysql.connector`

Data types used: Int, Str, List, Tuple

Script:

```
import mysql.connector

conn = mysql.connector.connect(host='127.0.0.1', user='root', password='root', database='journal')
cursor = conn.cursor()


def f(x) -> None:
    cursor.execute(x)
    [print(i) for i in cursor.fetchall()]


print("""
        #--------------------------------#
        |             rEee               |
        |   1. add student & teacher     |
        |   2. delete student            |
        |   3. raise fees by 100         |
        |   4. count students per class  |
        |   5. show details              |
        |   6. exit                      |
        #--------------------------------#""")

while True:
    o = int(input(">>> "))

    if o == 1:
        cursor.execute("insert into teacher values (%s, %s, %s)", eval(input("teacher: ")))
        cursor.execute("insert into student values (%s, %s, %s, %s, %s, %s, %s, %s)", eval(input("student: ")))
        conn.commit()

    elif o == 2:
        cursor.execute("delete from student where grno = %s", (int(input("grno: ")),))
        conn.commit()

    elif o == 3:
        cursor.execute("update student set fees = fees + 100 where class = '12'")
        conn.commit()

    elif o == 4:
        print(("Grade", "Count"))
        f("select class, count(*) from student group by class")

    elif o == 5:
        f(f"select student.grno, student.name, student.class, teacher.code, teacher.name, teacher.subject from student, teacher where student.tcode1 = teacher.code and teacher.code = {int(input('tcode: '))}")

    elif o == 6:
        break

    else:
        print("Invalid option.")
```

Output:

```
        #--------------------------------#
        |             rEee               |
        |   1. add student & teacher     |
        |   2. delete student            |
        |   3. raise fees by 100         |
        |   4. count students per class  |
        |   5. show details              |
        |   6. exit                      |
        #--------------------------------#
>>> 1
teacher: (4, "teacher n+1", "chemistry")
student: (4, "rEee", 17, '2008-04-11', '12', 1, 4, 1000.2)
>>> 2
grno: 2
>>> 3
>>> 4
('Grade', 'Count')
('H', 1)
('12', 2)
>>> 5
tcode: 1
(1, 'asdf', 'H', 1, 'teacher 1', 'comp. sci')
(4, 'rEee', '12', 1, 'teacher 1', 'comp. sci')
>>> 6
>>>
```