Task 1 Soln

```
# Task 1.1
f = open('MINEFIELD.txt', 'r')

# 1 mark reading size + rest of the lines
n = int(f.readline().strip())

# 1 mark create 2D array with '.' and 'S'
field = []
for i in range(n):
    field.append(['.'] * n)
field[n // 2][n // 2] = 'S'

mine_list = []
line = f.readline()
while line != '':
    x, y = line.split(',')
    x = int(x)
    y = int(y)
    mine_list.append((x, y)) # 1 mark update mine list
    field[x][y] = 'M'
    line = f.readline()

f.close()

# 1 mark display grid
print("Mine Field:")
for i in range(n):
    for j in range(n):
        print(field[i][j], end = ' ')
    print()

# 1 mark correct output
```

```
Mine Field:
. . M . . . .
. . . M . . .
. . . . . . M
. . . S M . .
. . . . . . .
. . . M . . .
. . . . . . .
```

```
# Task 1.2
import random
x = n // 2
y = n // 2
```

```
stop = False
win = False
steps = ''
moves = ['UP', 'DOWN', 'LEFT', 'RIGHT']

while not stop:
    move = random.randint(0, 3) # 1 mark for random moves

    # 4 cases with condition and updating of x/y
    # 1 mark for 2 correct cases, 1 mark for all carrect cases
    if move == 0: # move up
        x -= 1
    elif move == 1: # move down
        x += 1
    elif move == 2: # move left
        y -= 1
    else: # move right
        y += 1

    steps = steps + moves[move] + ' ' # 1 mark formating steps
string

    if field[x][y] == 'M': # 1 mark on condition to lose
        stop = True
    elif x == 0 or x == n - 1 or y == 0 or y == n - 1:
        # 1 mark on condition to win
        stop = True
        win = True
        field[x][y] = 'P'
    else:
        field[x][y] = 'P'
    # 1 mark updating 'P' for either case
# 1 mark correct exit of while loop


# 1 mark for displaying output (nested for + if-else)
print('STEPS:', steps)
for i in range(n):
    for j in range(n):
        print(field[i][j], end = ' ')
    print()
if win:
    print("WIN! You walked to the boundary!")
else:
    print('LOSE! You stepped onto the mine!')

# 1 mark for correct output
```

```
STEPS: LEFT UP DOWN DOWN RIGHT RIGHT RIGHT DOWN RIGHT
. . M . . . .
. . . M . . .
. . P . . . M
. . P S M . .
. . P P P P .
. . . M . P P
. . . . . . .
WIN! You walked to the boundary!
```

Task 2 Soln:

```
# Task 2.1
def read_csv(filename):
    books_file = open(filename, "r")
    book_str = books_file.read()
    book_list = book_str.split("\n")
    array = []
    for book in book_list:                          # loop to extract
        title, author, year = book.split(",")       # split the comma
        array.append([title, author, year])         # correct array
    books_file.close()
    return array
    # return must happen before file.close() (no marks)

books_array = read_csv("booklist.csv")              # correct output
print(len(books_array))
```

```
import csv
# Task 2.1 (alternative by csv package)
def read_csv(filename):
    books_file = open(filename, "r", encoding="utf-8")
    book_list = csv.reader(books_file, delimiter=",")
    array = []
    for book in book_list:            # loop to extract
        title, author, year = book        # split the comma
        array.append([title, author, year])          # correct array
    books_file.close()
    return array
    # return must happen before file.close() (no marks)

books_array = read_csv("booklist.csv")       # correct output
print(len(books_array))
print(books_array)
```

```
18
[['White Fang', 'Jack London', '1906'], ['The Wind in the Willows',
'Kenneth Grahame', '1908'], ['Moby Dick', 'Herman Melville', '1851'],
['Jane Eyre', 'Charlotte Bronte', '1847'], ['The Picture of Dorian
Gray', 'Oscar Wilde', '1890'], ['The Three Musketeers', 'Alexandre
Dumas', '1844'], ['Persuasion', 'Jane Austen', '1817'], ['Dream of the
Red Chamber', 'Cao Xueqin', '1791'], ['Little Women', 'Louisa May
Alcott', '1868'], ['The Phantom of the Opera', 'Gaston Leroux', '1909'],
['Water Margin', 'Shi Naian', '1450'], ['A Christmas Carol', 'Charles
Dickens', '1843'], ['One Hundred Years of Solitude', 'Gabriel Garcia
Marquez', '1967'], ['Nineteen Eighty-Four', 'George Orwell', '1949'],
['Journey to the West', 'Wu Chengen', '1592'], ['Romance of the Three
Kingdoms', 'Luo Guanzhong', '1522'], ['Fahrenheit 451', 'Ray Bradbury',
'1953'], ['War and Peace', 'Leo Tolstoy', '1867']]
```

```python
# Task 2.2
def bubble(array, sort_key):
    sort_dict = {"title": 0, "author": 1, "year": 2}
    if sort_key not in sort_dict:
        return -1                     # -1 return if invalid
    s = sort_dict[sort_key]          # convert sort_key to index
    length = len(array)
    for i in range(length-1,0,-1):
        for j in range(i):           # nested loop for bubble
            if array[j][s] > array[j+1][s]: # compare adjacent
                array[j], array[j+1] = array[j+1], array[j]
            # correct swap when needed
    return array

print(bubble(books_array,"title"))
print(bubble(books_array,"ISBN"))   # correct output
```

```
[['A Christmas Carol', 'Charles Dickens', '1843'], ['Dream of the Red
Chamber', 'Cao Xueqin', '1791'], ['Fahrenheit 451', 'Ray Bradbury',
'1953'], ['Jane Eyre', 'Charlotte Bronte', '1847'], ['Journey to the
West', 'Wu Chengen', '1592'], ['Little Women', 'Louisa May Alcott',
'1868'], ['Moby Dick', 'Herman Melville', '1851'], ['Nineteen Eighty-
Four', 'George Orwell', '1949'], ['One Hundred Years of Solitude',
'Gabriel Garcia Marquez', '1967'], ['Persuasion', 'Jane Austen',
'1817'], ['Romance of the Three Kingdoms', 'Luo Guanzhong', '1522'],
['The Phantom of the Opera', 'Gaston Leroux', '1909'], ['The Picture of
Dorian Gray', 'Oscar Wilde', '1890'], ['The Three Musketeers',
'Alexandre Dumas', '1844'], ['The Wind in the Willows', 'Kenneth
Grahame', '1908'], ['War and Peace', 'Leo Tolstoy', '1867'], ['Water
Margin', 'Shi Naian', '1450'], ['White Fang', 'Jack London', '1906']]
-1
```

```
# Task 2.3
def merge(array, sort_key):
    sort_dict = {"title": 0, "author": 1, "year": 2}
    if sort_key not in sort_dict:
        return -1
    s = sort_dict[sort_key]

    if len(array)<2:
        return array
    # correct return when no merge (base cases)

    mid = len(array) // 2
    left = merge(array[:mid],sort_key)
    right = merge(array[mid:],sort_key)
    # split the array in half
    # run merge sort on each recursively

    merged = []
    while len(left) and len(right): # repeat until 1 empty
        if left[0][s] <= right[0][s]: # take the smaller item
            merged = merged + [left.pop(0)]
        else:
            merged = merged + [right.pop(0)]

    merged = merged + left + right
    # merge after either L/R empty
    for i in range(len(array)):
        array[i] = merged[i]
    return array

print(merge(books_array,"author"))
print(merge(books_array,"year")) # correct output
```

```
[['The Three Musketeers', 'Alexandre Dumas', '1844'], ['Dream of the Red
Chamber', 'Cao Xueqin', '1791'], ['A Christmas Carol', 'Charles
Dickens', '1843'], ['Jane Eyre', 'Charlotte Bronte', '1847'], ['One
Hundred Years of Solitude', 'Gabriel Garcia Marquez', '1967'], ['The
Phantom of the Opera', 'Gaston Leroux', '1909'], ['Nineteen Eighty-
Four', 'George Orwell', '1949'], ['Moby Dick', 'Herman Melville',
'1851'], ['White Fang', 'Jack London', '1906'], ['Persuasion', 'Jane
Austen', '1817'], ['The Wind in the Willows', 'Kenneth Grahame',
'1908'], ['War and Peace', 'Leo Tolstoy', '1867'], ['Little Women',
'Louisa May Alcott', '1868'], ['Romance of the Three Kingdoms', 'Luo
Guanzhong', '1522'], ['The Picture of Dorian Gray', 'Oscar Wilde',
'1890'], ['Fahrenheit 451', 'Ray Bradbury', '1953'], ['Water Margin',
'Shi Naian', '1450'], ['Journey to the West', 'Wu Chengen', '1592']]

[['Water Margin', 'Shi Naian', '1450'], ['Romance of the Three
Kingdoms', 'Luo Guanzhong', '1522'], ['Journey to the West', 'Wu
Chengen', '1592'], ['Dream of the Red Chamber', 'Cao Xueqin', '1791'],
['Persuasion', 'Jane Austen', '1817'], ['A Christmas Carol', 'Charles
Dickens', '1843'], ['The Three Musketeers', 'Alexandre Dumas', '1844'],
['Jane Eyre', 'Charlotte Bronte', '1847'], ['Moby Dick', 'Herman
Melville', '1851'], ['War and Peace', 'Leo Tolstoy', '1867'], ['Little
Women', 'Louisa May Alcott', '1868'], ['The Picture of Dorian Gray',
'Oscar Wilde', '1890'], ['White Fang', 'Jack London', '1906'], ['The
Wind in the Willows', 'Kenneth Grahame', '1908'], ['The Phantom of the
Opera', 'Gaston Leroux', '1909'], ['Nineteen Eighty-Four', 'George
Orwell', '1949'], ['Fahrenheit 451', 'Ray Bradbury', '1953'], ['One
Hundred Years of Solitude', 'Gabriel Garcia Marquez', '1967']]
```

```
# Task 2.4
def reverse(array):
    length = len(array)
    mid = length // 2
    for i in range(mid): # using a loop
        array[i], array[length-1-i] = array[length-1-i], array[i]
        # swap to reverse
    return array

print(reverse([1,3,5,2,4]))
print(reverse([1,9,6,4])) # correct outputs
```

```
[4, 2, 5, 3, 1]
[4, 6, 9, 1]
```

```
# Task 2.5
arr = read_csv("newbooks.csv")
merge(arr,"year") # bubble/merge using year as key
reverse(arr) # reverse AFTER sorting

new_csv = open("YEAR_name_ct.csv", "w")
# open with "w" (must close at end)

book_str = []
for book in arr:
    book_str.append(",".join(book))
# re-combine with commas
ret_str = "\n".join(book_str)
new_csv.write(ret_str)
new_csv.close()
```

```
# evidence from csv:
Animal Farm,George Orwell,1945
Of Mice and Men,John Steinbeck,1937
To Kill a Mockingbird,Harper Lee,1960
The Catcher in the Rye,J. D. Salinger,1951
The Adventures of Tom Sawyer ,Mark Twain,1876
Monty Python's Big Red Book,Graham Chapman,1971
The Strange Case of Dr. Jekyll & Mr. Hyde,Robert Louis Stevenson,1886
The War of the Worlds,H. G. Wells,1898
Wuthering Heights,Emily Bronte,1847
Dracula,Bram Stoker,1897
Pride & Prejudice,Jane Austen,1813
The Great Gatsby,F. Scott Fitzgerald,1925
```

<u>Task 3 Soln:</u>

```
# Task 3.1
class Node:  # 1 mark
    def __init__(self, data, next):
        self.data = data
        self.next = next

class LinkedList:
    def __init__(self): # 1 mark
        self.head = None
        self.size = 0

    def to_String(self): # 1 mark
        items = []
        probe = self.head
        while probe != None:
            items.append(probe.data)
            probe = probe.next
        return ', '.join(items)

    def insert(self, word, p): # 6 marks
        if p == 1 or self.size == 0: # condition to add at the front
            self.head = Node(word, self.head) # correct update
        else:
            if p > self.size: # special case
                p = self.size + 1
            probe = self.head
            # for loop
            for i in range(1, p - 1):
                probe = probe.next
            probe.next = Node(word, probe.next) # correct update
        self.size += 1 # correct update

    def delete(self, p): # 4 marks
        if p == 1 or self.size == 1: # condition to delete at the front
            self.head = self.head.next # correct update
        else:
            if p > self.size: # special case
                p = self.size
            probe = self.head
            for i in range(1, p - 1):
                probe = probe.next
            probe.next = probe.next.next # correct update
        self.size -= 1

    def search(self, word): # 2 marks
        found = False
        probe = self.head

        while not found and probe != None:
            if probe.data == word: # correct case when found
```

```
                found = True
            else:
                probe = probe.next # correct probe until end of list

        return found

# test design with inserting at the front, normal p value, p > size
# 3 marks
ll = LinkedList()
ll.insert('apple', 5) # add to an empty linked list, and p > size
ll.insert('durian', 3) # add to the end of the linked list
ll.insert('pear', 2) # add item in between
print('items:',ll.to_String())

# test for found and not found, 2 marks
print(ll.search('apple'))
print(ll.search('carrot'))
```

```
items: apple, pear, durian
True
False
```

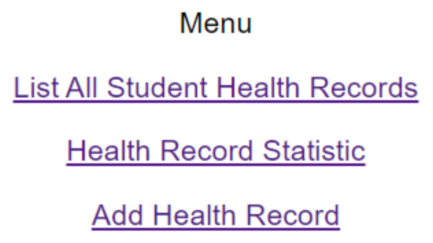
```
# Task 3.2
class Stack(LinkedList):
    def push(self, word):
        Stack.insert(self, word, 1)

    def pop(self):
        Stack.delete(self, 1)

s = Stack()
s.push('apple')
s.push('pear')
s.push('carrot')
s.pop()
print(s.to_String())
```

```
pear, apple
```

```
# Task 3.3
class Queue(LinkedList):
    def enqueue(self, word):
        Queue.insert(self, word, self.size + 1)

    def dequeue(self):
        Queue.delete(self, 1)

q = Queue()
q.enqueue('apple')
q.enqueue('pear')
q.enqueue('carrot')
q.dequeue()
print(q.to_String())
```

```
pear, carrot
```

Task 4 soln:

<!--Task4_1.htm -->
 	
<!DOCTYPE html>
<html>
<head><title>Menu</title>
<link rel="stylesheet" type="text/css"
href="{{ url_for('static', filename='styles.css') }}">
</head>
<body>
<p>Menu</p>
<p><a href="{{url_for("task4_2")}}">Student health
records</a></p>
<p><a href="{{url_for("task4_3")}}">Health record
statistics</a></p>
<p><a href="{{url_for("task4_4")}}">Add health
record</a></p>
 	
</body>
</html>
 	
### Task4_1 	
@app.route('/', methods=['GET'])
def task4_1():
    return render_template('task4_1.html')
 	
@app.route('/task4_2', methods=['GET'])
def task4_2():
    pass
 	
@app.route('/task4_3', methods=['GET'])
def task4_3():
    pass
 	

Menu
List All Student Health Records
Health Record Statistic
Add Health Record
	
	Total:4M
	
	[2M]
	Menu with 3 hyperlinks
	options
	At least 2 correct
	Links
	
	[1M]
	@app.route('/',
	methods=['GET'])
	def task4_1():
	
	[1M]
	And 2 dummy routes for
	Health record
	statistics amd Add
	health record if
	url_for() is used or 2
	hyperlinks

#Task4_2.sql SELECT student.name, student.gender, StudentHealthRecord.weight, StudentHealthRecord.height FROM student LEFT OUTER JOIN StudentHealthRecord ON student.studentID = StudentHealthRecord.studentid ORDER BY student.gender, student.name DESC	 Total:3M [1M] Select 4 fields: Name, Gender, Weight, Height [1M] student LEFT OUTER JOIN StudentHealthRecord ON student.studentID = StudentHealthRecord.stu dentid [1M]

ORDER BY
student.gender,
student.name DESC

```
<!--Task4_2.htm -->

<!DOCTYPE html>
<html>
<head><title>Student Health Records</title>
<link rel="stylesheet" type="text/css"
href="{{ url_for('static', filename='styles.css') }}">
</head>
<body>
<p>Student Health Records</p>
<table>
<tr><th>Name</th><th>Gender</th><th>Weight</th><th>Height</
th></tr>
{% if results|length > 0 %}
       {% for item in results  %}
    <tr>
        <td>{{ item.name }}</td>
              <td>{{ item.getGender() }}</td>
              <td>{{ item.getWeight() }}</td>
              <td>{{ item.getHeight() }}</td>
    </tr>
       {% endfor %}
{%else%}
    <tr>
        <td colspan="2">No logs</td>
    </tr>
{%endif%}
</table>
<p><a href="{{url_for("task4_1")}}">Back to Menu</a></p>
</body>
</html>
```

Total:6M

Template:

[1M]
For loop statement

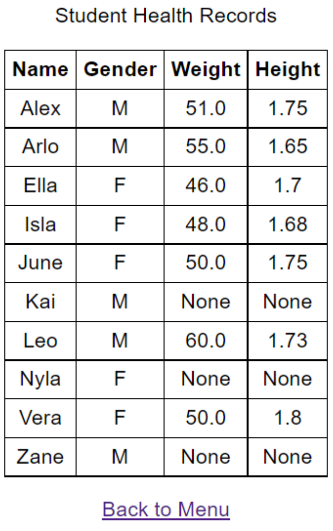
[1M]
Get cell data from item
2 correct item

```
### Task4_2
@app.route('/all')
def task4_2():
       sql="select  student.name, student.gender,
StudentHealthRecord.weight,StudentHealthRecord.height from
student left outer join StudentHealthRecord on
student.studentID = StudentHealthRecord.studentid  order by
name"
       db = sqlite3.connect('students.db')
       db.row_factory = sqlite3.Row
       cursor = db.execute(sql)
       all_rows = cursor.fetchall()
       cursor.close()
       db.close()
       listx=[]
       for row in all_rows:
             s=Student(row["name"], row["gender"],
row["weight"],row["height"])
             listx.append(s)
       return render_template('task4_2.html',
results=listx)
```

[1M]
@app.route('/all')
def task4_2():

[1M]
Connect to students.db
& execute SQL

[2M]
Render the correct
template and pass in
the list of objects to
resultset



Student Health Records

Name	Gender	Weight	Height
Alex	M	51.0	1.75
Arlo	M	55.0	1.65
Ella	F	46.0	1.7
Isla	F	48.0	1.68
June	F	50.0	1.75
Kai	M	None	None
Leo	M	60.0	1.73
Nyla	F	None	None
Vera	F	50.0	1.8
Zane	M	None	None

Back to Menu

```
#Task4_3.sql

SELECT  gender, COUNT(*), AVG(weight), AVG(height) FROM
student
INNER JOIN StudentHealthRecord ON
student.StudentID=StudentHealthRecord.StudentID
GROUP BY gender
```

```
Total:4M

[2M]
Select gender [for
grouping]
Count(*) – total by
gender
AVG(weight)
AVG(Height)

[1M]
student INNER JOIN
StudentHealthRecord ON
student.StudentID=Stude
ntHealthRecord.StudentI
D
GROUP BY gender

[1M] group by gender
```

Alternatively …

```
SELECT  COUNT(*) FROM student where gender='M'
SELECT  COUNT(*) FROM student where gender='F'
SELECT  AVG(weight) FROM student INNER JOIN
StudentHealthRecord ON
student.StudentID=StudentHealthRecord.StudentID
WHERE gender='M'
SELECT  AVG(weight) FROM student INNER JOIN
StudentHealthRecord ON
student.StudentID=StudentHealthRecord.StudentID
WHERE gender='F'
SELECT  AVG(height) FROM student INNER JOIN
StudentHealthRecord ON
student.StudentID=StudentHealthRecord.StudentID
WHERE gender='M'
SELECT  AVG(height) FROM student INNER JOIN
StudentHealthRecord ON
student.StudentID=StudentHealthRecord.StudentID
WHERE gender='F'
```

Alternatively …

```
[1M]
Count for both gender

[1M]
Correct INNER JOIN for
the next 4 SQL
student INNER JOIN
StudentHealthRecord ON
student.StudentID=Stude
ntHealthRecord.StudentI
D

[1M] AVG(weight) for
both gender
[1M] AVG(height) for
both gender
```

Total:5M

Template:

```
<!--Task4_3.htm -->

<!DOCTYPE html>
<html>
<head><title>Health Record Statistics</title>
<link rel="stylesheet" type="text/css"
href="{{ url_for('static', filename='styles.css') }}">
</head>
<body>
<p>Health Record Statistics</p>
<table>
<tr><th>Attributes</th><th>Male</th><th>Female</th></tr>
{% if results|length > 0 %}
       {% for item in results  %}
    <tr>
        <td>{{ item.getAttribute() }}</td>
             <td>{{ item.getMale() }}</td>
             <td>{{ item.getFemale() }}</td>
    </tr>
       {% endfor %}
{%else%}
    <tr>
        <td colspan="3">No logs</td>
    </tr>
{%endif%}
</table>
<p><a href="{{url_for("task4_1")}}">Back to Menu</a></p>
</body>
</html>
```

[1M]
For loop statement

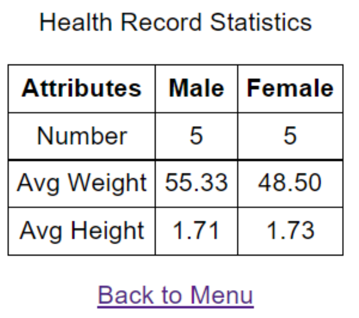
[1M]
Get cell data from item
2 correct item

```
### Task4_3
@app.route('/statistics', methods=['GET'])
def task4_3():
       db = sqlite3.connect('students.db')
       db.row_factory = sqlite3.Row
       sql="select  gender as gender, count(*) as cnt,
avg(weight) as wt,  avg(height) as ht from student left
outer join StudentHealthRecord on
student.StudentID=StudentHealthRecord.StudentID group by
gender"
       cursor = db.execute(sql)
       all_rows = cursor.fetchall()
       cursor.close()
       db.close()
       listx=[]
       numberRec = Record("Number")
       weightRec = Record("Avg Weight")
       heightRec = Record("Avg Height")

       for row in all_rows:
              if row["gender"]=="M":
                     numberRec.setMale(row["cnt"])
                     weightRec.setMale(row["wt"])
                     heightRec.setMale(row["ht"])
              else:
                     numberRec.setFemale(row["cnt"])
                     weightRec.setFemale(row["wt"])
                     heightRec.setFemale(row["ht"])
       listx.append(numberRec)
       listx.append(weightRec)
       listx.append(heightRec)
       return render_template('task4_3.html',
results=listx)
```

[1M]
@app.route('/statistics
)
def task4_2():

[1M]
Formatting of resultset
to follow how the data
is displayed on the web
page.

[1M]
Render the correct
template and pass in
the list of objects to
resultset



Health Record Statistics

Attributes	Male	Female
Number	5	5
Avg Weight	55.33	48.50
Avg Height	1.71	1.73

Back to Menu

```
#Task4_4.sql

INSERT INTO Student(Name, Gender) VALUES(‘Helen’,’F’)
##Assumming the studentID is 12
INSERT INTO StudentHealthRecord (StudentID, Weight, Height)
VALUES (12, 48.7, 1.72)
```

```
Total:2M
[1M]
INSERT INTO
Student(Name, Gender)
VALUES(…)

[1M]
INSERT INTO
StudentHealthRecord
(StudentID, Weight,
Height) VALUES(…)
```

```
<!--Task4_4.html -->

<!DOCTYPE html>
<html>
<head><title>Add Health Record</title>
<link rel="stylesheet" type="text/css"
href="{{ url_for('static', filename='styles.css') }}">
</head>
<body>
<p>Add Health Record</p>
<form method="POST" action="/add" >
    <p><label for="name" >Name: </label><input type="text"
value="" name="name" id="name" ></p>
       <p><label for="gender" >Gender: </label><input
type="radio" value="M" name="gender"
id="gender" >Male</input><input type="radio" value="F"
name="gender" id="gender" >Female</input></p>
       <p><label for="weight" >Weight: </label><input
type="text" value="" name="weight" id="weight" ></p>
       <p><label for="height" >Height: </label><input
type="text" value="" name="height" id="height" ></p>
    <p><input type="submit" name="action" value="Add" ></p>
</form>
<p><a href="{{url_for("task4_1")}}">Back to Menu</a></p>
</body>
</html>

### Task4_4
@app.route('/add', methods=['GET', 'POST'])
def task4_4():
       if request.method=='GET':
              return render_template('task4_4.html')
       if 'action' in request.form:
              action = request.form['action']
              name = request.form['name']
```

```
Total:6M

Given template:
Task4_4.html

[1M] path:”/add”, both
methods

@app.route('/add',
methods=['GET',
'POST'])
```

```
            gender = request.form['gender']
            weight = request.form['weight']
            height = request.form['height']
      if action == 'Add':
            try:
                  db = sqlite3.connect('students.db')
                  cur = db.cursor()
                  cur.execute("Insert into Student(Name,
Gender) values(?,?)",(name,gender))
                  studentID = cur.lastrowid
                  cur = db.execute("INSERT INTO
StudentHealthRecord (StudentID, Weight, Height) VALUES
(?, ?,?)",(studentID,weight,height))
                  db.commit()
                  cur.close()
                  db.close()
                  return render_template('Task4_4k.html',
msg="Added successfully")
            except:
                  if db:
                        db.close()
                        return
render_template('Task4_4k.html',  msg="Add Error")
                  else:
                        return
redirect(url_for('task4_1'))
      else:
            result_msg=''
            return redirect(url_for('task4_1'))
```

[1M]:
Request.method=='GET'
Return template
"Task4_4.html"

[1M]
For
Request.method=='POST'
Get values from form

[1M]
Connect to database,
insert statement into
Student table

[1M]
Get inserted ID

[1M]
Insert statement into
StudentHealthRecord
Commit and close
connection

```
<!--Task4_5.htm not required -->

<!DOCTYPE html>
<html>
<head><title>Add Health Record</title>
<link rel="stylesheet" type="text/css"
href="{{ url_for('static', filename='styles.css') }}">
</head>
<body>
<p>Add Health Record</p>
<p> Record added successfully </p>
<p><a href="{{url_for("task4_1")}}">Back to Menu</a></p>
</body>
</html>
```

Not required

```
## Student.py
##class Student - Helper class used to contain student
particular for Task4_2

class Student:
      def __init__(self, name, gender, weight, height,
id=0 ):
            self._studentID = id
            self._name=name
            self._gender =gender
            self._weight=weight
            self._height=height

      def getStudentID(self):
            return self._studentID

      def setStudentID(self, id):
```

Not required

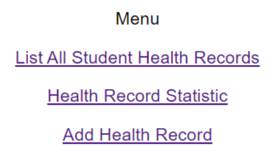
```
        self._studentID=id

    def getName(self):
        return self._name

    def setName(self, name):
        self._name=name

    def getGender(self):
        return self._gender

    def setGender(self, gender):
        self._gender=gender

    def getWeight(self):
        return self._weight

    def setWeight(self, weight):
        self._weight=f'{weight:.2f}'

    def getHeight(self):
        return self._height

    def setHeight(self, height):
        self._height=f'{height:.2f}'
```

```
## HealthRecord.py
## class Record - Helper class used to contain health
statistic for Task4_3

class Record:
    def __init__(self, attribute):
        self._attribute = attribute
        self._male=0
        self._female=0

    def getAttribute(self):
        return self._attribute

    def setAttribute(self, attribute):
        self._attribute=attribute

    def getMale(self):
        return self._male

    def setMale(self, male):
        if self._attribute=="Number":
            self._male= f'{male}'
        else:
            self._male= f'{male:.2f}'

    def getFemale(self):
        return self._female

    def setFemale(self, female):
        if self._attribute=="Number":
            self._female=f'{female}'
        else:
            self._female=f'{female:.2f}'
```

Not required

```
## Task4.py

import flask, os, sqlite3
from Student import Student
from HealthRecord import Record
from flask import render_template, request, redirect,
url_for

app = flask.Flask(__name__,  static_folder='./static',
template_folder='./templates')


### Task4_1
@app.route('/', methods=['GET'])
def task4_1():
    return render_template('task4_1.html')

### Task4_2
@app.route('/all')
def task4_2():
       sql="select  student.name, student.gender,
StudentHealthRecord.weight,StudentHealthRecord.height from
student left outer join StudentHealthRecord on
student.studentID = StudentHealthRecord.studentid  order by
name"
       db = sqlite3.connect('students.db')
       db.row_factory = sqlite3.Row
       cursor = db.execute(sql)
       all_rows = cursor.fetchall()
       cursor.close()
       db.close()
       listx=[]
       for row in all_rows:
            s=Student(row["name"], row["gender"],
row["weight"],row["height"])
            listx.append(s)
       return render_template('task4_2.html',
results=listx)

### Task4_3
@app.route('/statistics', methods=['GET'])
def task4_3():
       db = sqlite3.connect('students.db')
       db.row_factory = sqlite3.Row
       sql="select  gender as gender, count(*) as cnt,
avg(weight) as wt,  avg(height) as ht from student left
outer join StudentHealthRecord on
student.StudentID=StudentHealthRecord.StudentID group by
gender"
       cursor = db.execute(sql)
       all_rows = cursor.fetchall()
       cursor.close()
       db.close()
       listx=[]
       numberRec = Record("Number")
       weightRec = Record("Avg Weight")
       heightRec = Record("Avg Height")

       for row in all_rows:
             if row["gender"]=="M":
                    numberRec.setMale(row["cnt"])
                    weightRec.setMale(row["wt"])
                    heightRec.setMale(row["ht"])
             else:
                    numberRec.setFemale(row["cnt"])
                    weightRec.setFemale(row["wt"])
                    heightRec.setFemale(row["ht"])
       listx.append(numberRec)
       listx.append(weightRec)
       listx.append(heightRec)
       return render_template('task4_3.html',
results=listx)

### Task4_4
@app.route('/add', methods=['GET', 'POST'])
def task4_4():
       if request.method=='GET':
              return render_template('task4_4.html')
       if 'action' in request.form:
              action = request.form['action']
              name = request.form['name']
              gender = request.form['gender']
              weight = request.form['weight']
              height = request.form['height']
       if action == 'Add':
              try:
                     db = sqlite3.connect('students.db')
                     cur = db.cursor()
                     cur.execute("Insert into Student(Name,
Gender) values(?,?)",(name,gender))
                     studentID = cur.lastrowid
                     cur = db.execute("INSERT INTO
StudentHealthRecord (StudentID, Weight, Height) VALUES
(?, ?,?)",(studentID,weight,height))
                     db.commit()
                     cur.close()
                     db.close()
                     return render_template('Task4_4k.html',
msg="Added successfully")
              except:
                     if db:
                            db.close()
                            return
render_template('Task4_4k.html',  msg="Add Error")
                     else:
                            return
redirect(url_for('task4_1'))
       else:
              result_msg=''
              return redirect(url_for('task4_1'))



if __name__ == '__main__':
       app.run()
```

Task4_1



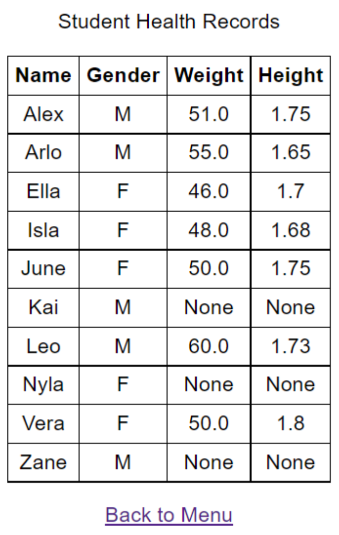
Menu

List All Student Health Records

Health Record Statistic

Add Health Record

Task4_2

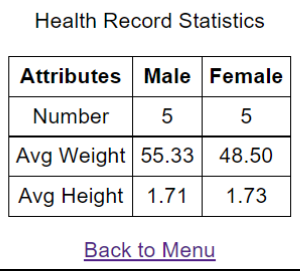


Student Health Records

Name	Gender	Weight	Height
Alex	M	51.0	1.75
Arlo	M	55.0	1.65
Ella	F	46.0	1.7
Isla	F	48.0	1.68
June	F	50.0	1.75
Kai	M	None	None
Leo	M	60.0	1.73
Nyla	F	None	None
Vera	F	50.0	1.8
Zane	M	None	None

Back to Menu

Task4_3

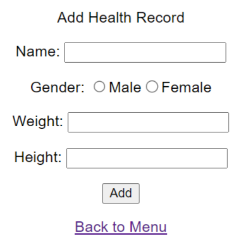


Health Record Statistics

Attributes	Male	Female
Number	5	5
Avg Weight	55.33	48.50
Avg Height	1.71	1.73

Back to Menu

Task4_4



Add Health Record

Name:

Gender: ○ Male ○ Female

Weight:

Height:

Add

Back to Menu

Coding Standard [4]

[1] comments in any task

[1] comments in all task

[1] all meaningful name

[1] white space for all task