AHSANULLAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

Department of Computer Science and Engineering

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Hospital Diagnosis System using Forward Chaining Algorithm

1. Input

- Patient Name
- Symptoms
    - sneezing
    - runny nose
    - headache
    - fever

eg. Patient: Joy
Symptoms: sneezing, runny nose

2. Steps of Processing

For all patients, all symptoms are processed as facts and added to knowledgebase.
eg. [Joy, sneezing] , [Joy, runny nose]

For generating a diagnosis for existing patients, and a diagnosis is found to be true if the following two combinations are found in their symptoms/knowledgebase facts:

- headache, fever, runny nose ====> flu
- sneezing, runny nose ====> common cold

3. Output

The diagnosis for the patient is added to the knowledgebase.
eg. [Joy, common cold]

4. Implementation

```
global facts
global is_changed
global diagnosed
is_changed = True
facts =
[["Rahim","headache"],["Karim","headache"],["Hasib","headache"],
         ["Karim","fever"],["Hasib","fever"],["Hasib","sneezing"],
         ["Rahim","sneezing"],["Karim","runny nose"],["Rahim","runny
nose"]]
diagnosed = [["Mauni", "flu"]]
```

```
def assert_diagnosis(diagnose):
    global diagnosed
    global is_changed
    if not diagnose in diagnosed:
        diagnosed += [diagnose]
        is_changed = True
        print("\nDiagnosis added :\n" , diagnose)

def assert_fact(fact):
    global facts
    if not fact in facts:
        facts += [fact]
        print("\nPatient and symptom added :\n" , fact)

def view():
    print("\n------Hospital Knowledgebase:------")
    print("\nAll patients and their symptoms:\n", facts)
    print("\nAll diagnosed patients:\n", diagnosed)

def diagnose():
    global is_changed
    print("\n\n------Diagnosis Activities:------\n")
    while is_changed:
        is_changed = False
        for A1 in facts:
            if A1[1] == "runny nose" and [A1[0], "sneezing"] in facts:
                assert_diagnosis([A1[0],"common cold"])
            if A1[1] == "runny nose" and [A1[0], "fever"] in facts and
[A1[0], "headache"] in facts:
                assert_diagnosis([A1[0],"flu"])

def input_p():
    input_name = input("Enter the patient's name: ")
    input_symptom_no = input("Enter the number of symptoms: ")
    i=0
    while(i<(int(input_symptom_no))):
        input_symptom = input("Enter their symptom: ")
        if input_symptom == "fever" or input_symptom == "runny nose" or
input_symptom == "sneezing" or input_symptom == "headache":
            assert_fact([input_name,input_symptom])
            i=i+1
        else:
            print("Wrong symptom - enter fever or runny nose or
sneezing or headache")
```

```
exit = True
while exit:
    print("\n-----WELCOME TO THE HOSPITAL DIAGNOSIS SYSTEM-----\n")
    print("\n\t1.\tView Hospital Knowledgebase.")
    print("\t2.\tAdmit patient.")
    print("\t3.\tDiagnose patients.")
    print("\t4.\tExit.")
    print("\t5.\tSave Hospital Knowledgebase.")
    input_choice = input("\nEnter choice: ")
    if input_choice == '1':
        view()
    if input_choice == '2':
        input_p()
    if input_choice == '3':
        diagnose()
    if input_choice == '4':
        exit = False
    if input_choice == '5':
        with open('Hospital.txt', 'w') as f:
            f.write("Diagnoses:\n")
            for item in diagnosed:
                f.write("%s\n" % item)
            f.write("\nPatients and symptoms:\n")
            for item in facts:
                f.write("%s\n" % item)
```

5. Saved database of intermediate activities

1) Initial hospital knowledgebase

```
-----WELCOME TO THE HOSPITAL DIAGNOSIS SYSTEM-----


        1.      View Hospital Knowledgebase.
        2.      Admit patient.
        3.      Diagnose patients.
        4.      Exit.
        5.      Save Hospital Knowledgebase.

Enter choice: 1

------Hospital Knowledgebase:------

All patients and their symptoms:
 [['Rahim', 'headache'], ['Karim', 'headache'], ['Hasib', 'headache'], ['Karim', 'fever'],
['Hasib', 'fever'], ['Hasib', 'sneezing'], ['Rahim', 'sneezing'], ['Karim', 'runny nose'],
['Rahim', 'runny nose']]

All diagnosed patients:
 [['Mauni', 'flu']]
```

[Contents of 'Hospital.txt' file]

Diagnoses:
['Mauni', 'flu']

Patients and symptoms:
['Rahim', 'headache']
['Karim', 'headache']
['Hasib', 'headache']
['Karim', 'fever']
['Hasib', 'fever']
['Hasib', 'sneezing']
['Rahim', 'sneezing']
['Karim', 'runny nose']
['Rahim', 'runny nose']

2) Hospital knowledgebase after admitting a patient

```
-----WELCOME TO THE HOSPITAL DIAGNOSIS SYSTEM-----


        1.      View Hospital Knowledgebase.
        2.      Admit patient.
        3.      Diagnose patients.
        4.      Exit.
        5.      Save Hospital Knowledgebase.

Enter choice: 2
Enter the patient's name: Joy
Enter the number of symptoms: 2
Enter their symptom: runny nose

Patient and symptom added :
 ['Joy', 'runny nose']
Enter their symptom: sneezing

Patient and symptom added :
 ['Joy', 'sneezing']

-----WELCOME TO THE HOSPITAL DIAGNOSIS SYSTEM-----


        1.      View Hospital Knowledgebase.
        2.      Admit patient.
        3.      Diagnose patients.
        4.      Exit.
        5.      Save Hospital Knowledgebase.

Enter choice: 5
```

[Contents of 'Hospital.txt' file]

Diagnoses:
['Mauni', 'flu']

Patients and symptoms:
['Rahim', 'headache']
['Karim', 'headache']
['Hasib', 'headache']
['Karim', 'fever']
['Hasib', 'fever']
['Hasib', 'sneezing']
['Rahim', 'sneezing']
['Karim', 'runny nose']
['Rahim', 'runny nose']
['Joy', 'runny nose']
['Joy', 'sneezing']

```
Enter choice: 1

------Hospital Knowledgebase:------

All patients and their symptoms:
 [['Rahim', 'headache'], ['Karim', 'headache'], ['Hasib', 'headache'], ['Karim', 'fever'],
['Hasib', 'fever'], ['Hasib', 'sneezing'], ['Rahim', 'sneezing'], ['Karim', 'runny nose'],
['Rahim', 'runny nose'], ['Joy', 'runny nose'], ['Joy', 'sneezing']]

All diagnosed patients:
 [['Mauni', 'flu']]
```

3) Hospital knowledgebase after diagnosis

```
-----WELCOME TO THE HOSPITAL DIAGNOSIS SYSTEM-----


        1.      View Hospital Knowledgebase.
        2.      Admit patient.
        3.      Diagnose patients.
        4.      Exit.
        5.      Save Hospital Knowledgebase.

Enter choice: 3


------Diagnosis Activities:------


Diagnosis added :
 ['Karim', 'flu']

Diagnosis added :
 ['Rahim', 'common cold']

Diagnosis added :
 ['Joy', 'common cold']

-----WELCOME TO THE HOSPITAL DIAGNOSIS SYSTEM-----


        1.      View Hospital Knowledgebase.
        2.      Admit patient.
        3.      Diagnose patients.
        4.      Exit.
        5.      Save Hospital Knowledgebase.

Enter choice: 5
```

[Contents of 'Hospital.txt' file]

Diagnoses:
['Mauni', 'flu']
['Karim', 'flu']
['Rahim', 'common cold']
['Joy', 'common cold']

Patients and symptoms:
['Rahim', 'headache']

['Karim', 'headache']
['Hasib', 'headache']
['Karim', 'fever']
['Hasib', 'fever']
['Hasib', 'sneezing']
['Rahim', 'sneezing']
['Karim', 'runny nose']
['Rahim', 'runny nose']
['Joy', 'runny nose']
['Joy', 'sneezing']

```
Enter choice: 1

------Hospital Knowledgebase:------

All patients and their symptoms:
 [['Rahim', 'headache'], ['Karim', 'headache'], ['Hasib', 'headache'], ['Karim', 'fever'],
['Hasib', 'fever'], ['Hasib', 'sneezing'], ['Rahim', 'sneezing'], ['Karim', 'runny nose'],
['Rahim', 'runny nose'], ['Joy', 'runny nose'], ['Joy', 'sneezing']]

All diagnosed patients:
 [['Mauni', 'flu'], ['Karim', 'flu'], ['Rahim', 'common cold'], ['Joy', 'common cold']]
```