Birla Institute of Technology and Science, Pilani

Hyderabad Campus

2nd Semester 2019-2020 (CS F407: Artificial Intelligence)

Assignment 1 (Max Marks:) 30, Date of Submission: **12th March 2020**

Q.1 In this assignment, you will create a messenger bot using any language of your choice which can provide intelligent dialog conversations with the user, similar to ELIZA or ALICE as shown below:

User: Hi, my name is Raj.

Bot: Hi Raj, how are you?

User: I am fine.

Bot: Good to know that.

User: Can you help me in choosing the elective course this semester?

Bot: Sure. I can do that. Can you let me know the domain you are interested in?

User: No I don't have any.

Bot: Why is that?

User: I am not sure.

Bot: Are you telling you are not interested in any domain?

User: Yes.

Bot: But you wanted to choose an elective subject to study this semester?

User: Yes

Bot: Can you let me know the name of the faculty you like?

The messenger bot has to use a knowledgebase with multiple random responses exchanged between the user and the bot. The bot should be able to give replies to multiple interactions and should be able to store the conversations in a database/knowledgebase. The knowledgebase can be stored using MySQL, SQLite or in any other flat file. These can store persistent copies of the interactions. The bot should also be able to interact with web services and help the user decide the course to be taken based on the recent trends in the industry or the recent trending jobs   (from sites like ubuntupit or any open source APIs), etc. The interactions with the web services have to be created using RESTful services (you can use Flask). The bot should also be able to recommend you to select a subject based on your domain of interest or based on the professor in whose class he/she is interested in. Create your own corpus for recommending such courses. You should use Artificial Intelligence Markup Language (AIML) for creating the core of the chatbot. The frontend should be an Android app developed by you for this purpose. No machine learning is to be used and the whole assignment would be based on keyword matching and intent recognition.

Q.2 Consider a grid with random starting point(x) and ending point(y)has shown in figure 1.A bot standing at position x has to reach position y, the only way it can move from its current position is LEFT,RIGHT,UP,DOWN. Finite number of obstacles are present in the grid. A bot cannot move further when it hits an obstacle. Write a program to implement a depth first backtracking solution to find a path from initial state to desired state.

Figure 1
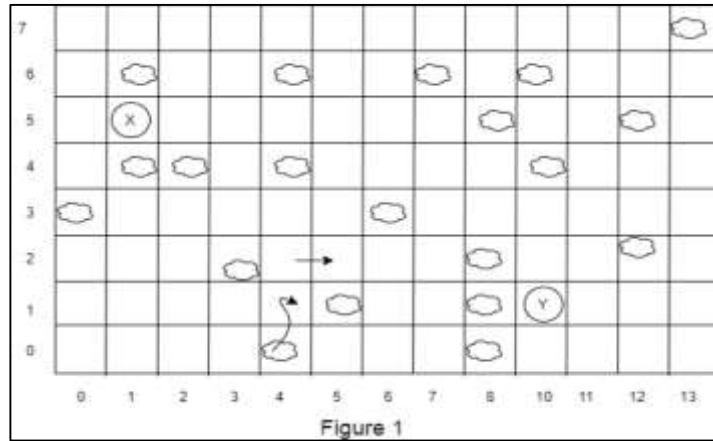
Nodes(O) represent starting and ending points and Clouds represent obstacles. Solid line arrows indicates move towards RIGHT, and curved arrow indicate move towards previous position. Give a valid sequence from X to Y.

Ex: (1,5,R)->(2,5,D)->(2,4,U)->(2,5)......

Q.3 DTDC courier service has to send goods from BITS Pilani,Hyderabad Campus to RGIA, Shamsabad. Below Fig 2 shows various possible routes available from BITS Pilani,Hyderabad Campus to RGIA, Shamsabad. Write a program to find out an optimal path from BITS Pilani,Hyderabad Campus to RGIA, Shamsabad other than the ones given in the map. Your solution can also be the same as Google map for some occasions. To solve the problem of finding an optimal route, you should use OpenStreetMap API [Ref:1] (as shown in Fig.3) to fetch the coordinates of townships(localities) in latitude and longitude from the source to the destination. This data has to be pushed into a database like PostgreSQL [Ref:2] (an open source database) in conjunction with PostGIS [Ref:3] or can be stored in a flat file. An A* search algorithm (Best-first search) has to be implemented to calculate the transit time to reach a particular destination from any source. For getting the transit time between different locations in the database file (or in the flat file stored in the previous step) you can use the distance metric API from google [Ref:4] which can be used as the heuristic function in the A* algorithm. The result of the A* algorithm has to be projected by the help of REST APIs on the map or shown in the form of coordinates of the nodes, followed by the computed route, as output on the monitor. The build has to be implemented using Python.
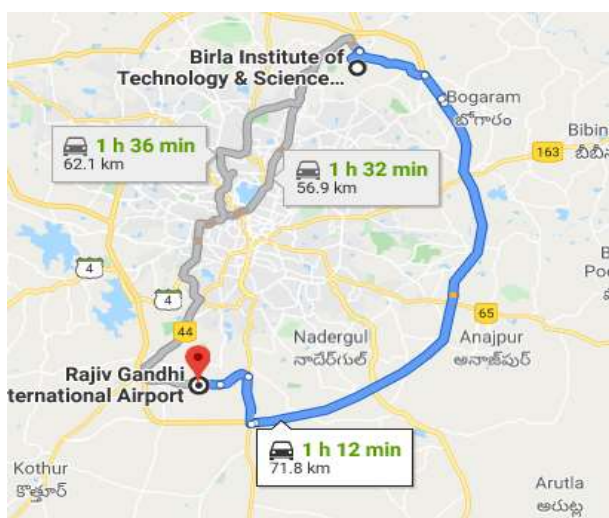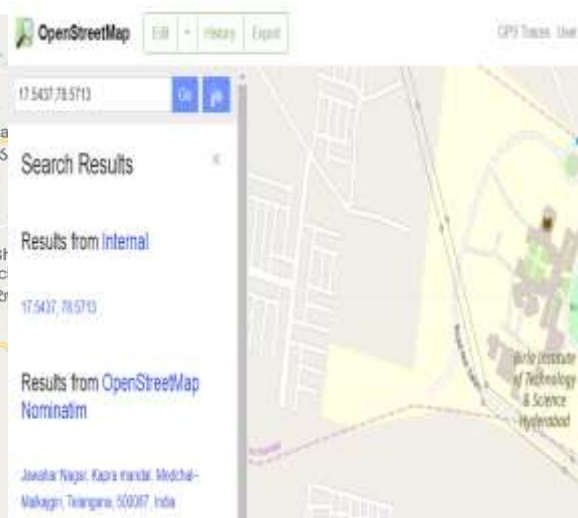

| Figure 2 | Figure 3 |

Mode of Submission:
Form your own groups of three only. Tar the entire source and executable files with your id as the tar file name (e.g. f20170055.tar) and send it to the mail id: p20170433@hyderabad.bits-pilani.ac.in. Include a readme.txt with your group details in your tar file. Submit only one file per group.

(Date given: 13th Feb 2020)