Course ID: C951
Course title: Introduction to AI
Project Title: Task I
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Introduction

This submission will discuss the implementation of a chatbot to assist students enrolled in the Computer Science program in selecting a developer job post-graduation. It will review the features offered by the chatbot and the design and logic behind its functionality.

Task A

The chatbot is designed as a simple reflex agent (Russell, S., & Norvig, P., 2020, p 49) where the chatbot's responses are based on the current prompt. The chatbot will take text-based user input and provide a response based on the content. The chatbot will handle the simplicity of the data flow by providing users with very specific answers to inquiries that essentially guide the user to the next prompt in the program. The eventual goal will either be to determine a suitable recommendation or to handle edge cases (e.g., the user isn't a Computer Science student, the user isn't close to graduating, etc.).

Task B

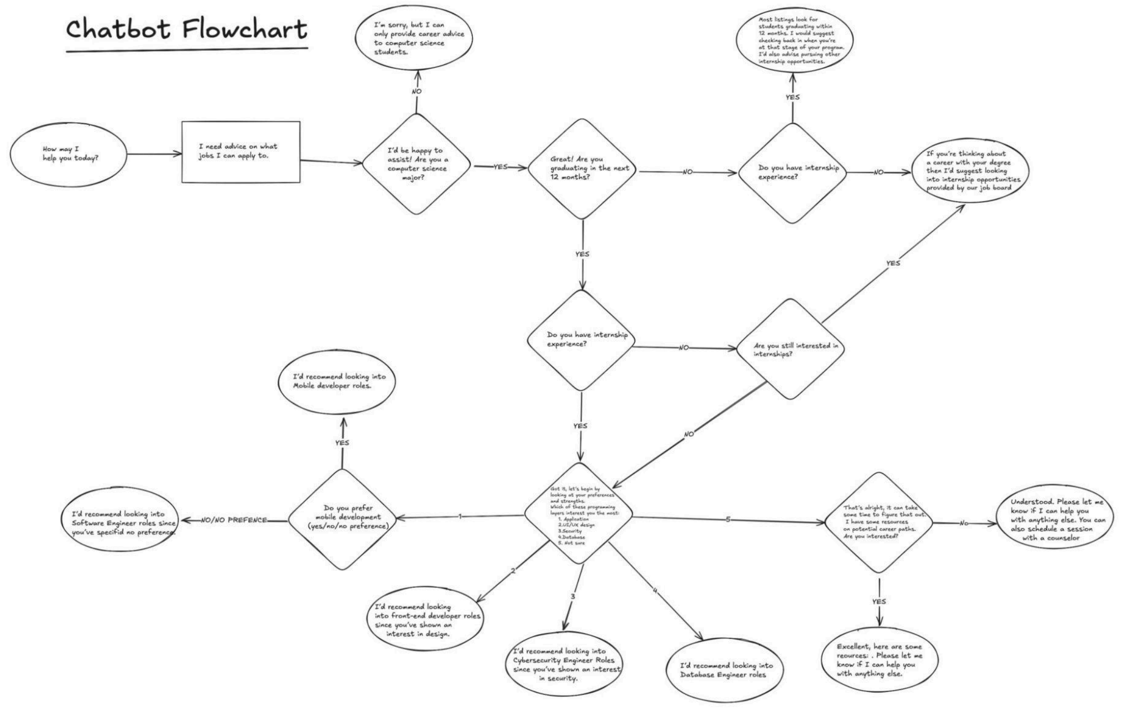
The five computing jobs that the chatbot will recommend to Computer Science students are: Software Engineer, Mobile Developer, Front End Developer, Data Engineer, and Security Engineer. All of the recommendations are for entry-level roles.

Task C

Code files will be provided in a separate file attachment in the final submission.

Task D

The training cases for this chatbot were selected through research conducted with a flowchart. The idea was to keep the design simple and provide a minimum viable product while still meeting functionality deliverables. Here is an image attachment of the flowchart that served as a high-level concept mapping of the program:


Chatbot Flowchart
How may I help you today?
I need advice on what jobs I can apply to.
I'd be happy to assist! Are you a computer science major?
NO
I'm sorry, but I can only provide career advice to computer science students.
YES
Great! Are you graduating in the next 12 months?
NO
Do you have internship experience?
YES
Most listings look for students graduating within 12 months. I would suggest checking back in when you're at that stage of your program. I'd also advise pursuing other internship opportunities.
NO
If you're thinking about a career with your degree then I'd suggest looking into internship opportunities provided by our job board
YES
Do you have internship experience?
NO
Are you still interested in internships?
YES
NO
YES
Got it, let's begin by looking at your preferences and strengths. Which of these programming layers interest you the most: 1. Application 2.UI/UX design 3.Security 4.Database 5. Not sure
1
Do you prefer mobile development (yes/no/no preference)
YES
I'd recommend looking into Mobile developer roles.
NO/NO PREFENCE
I'd recommend looking into Software Engineer roles since you've specifid no preference.
2
I'd recommend looking into front-end developer roles since you've shown an interest in design.
3
I'd recommend looking into Cybersecurity Engineer Roles since you've shown an interest in security.
4
I'd recommend looking into Database Engineer roles
5
That's alright, it can take some time to figure that out. I have some resources on potential career paths. Are you interested?
No
Understood. Please let me know if I can help you with anything else. You can also schedule a session with a counselor
YES
Excellent, here are some reources: . Please let me know if I can help you with anything else.

The cases themselves were meant to mirror a real-life interaction with a student and a counselor, and the scenarios were boiled down to four:

1) Students who were near graduating and could reasonably start thinking about job searching while maintaining what's left of their studies, within 12 months of graduation was the decided constraint.
2) Students who were still too early in the program to balance a job search and completing school
3) Students with internship experience.
4) Students without internship experience.

Certain AIML features were used to branch the flow of the chatbot program based on certain responses. Here is a snippet illustrating this:

```
    <category>
        <pattern>YES</pattern>
        <that>ARE YOU A COMPUTER SCIENCE MAJOR</that>
        <template>Great! Are you graduating in the next 12
months?</template>
    </category>

    <!--> Category II: graduation timeline <!-->
    <category>
        <pattern>NO</pattern>
        <that>ARE YOU GRADUATING IN THE NEXT 12 MONTHS</that>
        <template>
            Do you have internship experience?
            <think><set name="topic">junior</set></think>
        </template>
    </category>

    <category>
        <pattern>YES</pattern>
        <that>ARE YOU GRADUATING IN THE NEXT 12 MONTHS</that>
        <template>
            Do you have internship experience?
            <think><set name="topic">senior</set></think>
        </template>
    </category>

    <!--> JUNIOR STUDENT TOPICS: <!-->
    <topic name="junior">
     ...
    </topic>


  <!--> SENIOR STUDENT TOPICS: <!-->
    <topic name="senior">
     ...
    </topic>
```

The program flow was split and guided through the use of <*topic*> tabs, and the conversation narrative was maintained and chained using <*that*> tags.

Other training cases were reduction training cases to mimic real-life conversation by allowing the program to identically interpret multiple user inputs that symbolically have the same meaning conversationally, but aren't identical character-wise using the <strai> tag. Below is a snippet of this:

```
    <category>
        <pattern>Y</pattern>
        <template><srai>Yes</srai></template>
    </category>

    <category>
```

```
        <pattern>I AM</pattern>
        <template><srai>Yes</srai></template>
    </category>

    <category>
        <pattern>YES I AM</pattern>
        <template><srai>Yes</srai></template>
    </category>
```

All of these inputs symbolically mean ‘yes’ in the English language.

Task E

The chatbot exists in a sandboxed environment on the Pandorabots platform, and a Pandorabots account is required to access this bot. A free-tier account does not support direct public links or URLS. Here are the steps to access (“install”) the chatbot:

1. Log in to pandorabots.com through a web browser.
2. Go to https://home.pandorabots.com/dash/bot-directory.
3. Run a search for the “C951-CS_career-chatbot” in the directory.
4. Tap on the chatbot icon.
5. Enter CAREER or START to start the chat.

Task F

Some of the strengths of the chatbot development environment: ease of use, good supporting documentation, the environment is preconfigured, and version control is available (to an extent, no GitHub CLI) if you create an account using GitHub.

Some of the weaknesses are mostly limited features. Real deployment (e.g., independent hosting, source code etc.), access to APIs, 3rd party access, etc, all require a paid membership to Pandorabots. AIML in itself can also be limited since it’s not structured in the same way as conventional programming languages. Achieving certain tasks, such as looping, storing variables, or coupling, can become syntactically dense.

Task G

What is presented at the time of this submission is a minimum viable product. In terms of improvement, there are already plans to refine current features (e.g., consolidating certain <category> statements by using conditionals and loops and adding additional reduction cases) and adding new features (e.g., using sets and maps to store references to previous conversations, such as the user’s name).

Should the chatbot gain enough user activity, monitoring will be achieved by upgrading the account, which gives access to sessions, analytics, API, third-party integrations etc.

References

- Russell, S., & Norvig, P. (2020). *Artificial Intelligence: A Modern Approach* (4th ed.). Pearson Education (US). https://wgu.vitalsource.com/books/9780134671932