CSE 1321L: Programming and Problem Solving I Lab

Assignment 3 – 100 points
Solving Problems

What students will learn:
1) Problem solving
2) Structure programs to include conditional logic
3) Write code that includes if/else statements
4) Design programs that leverage switch/case logic
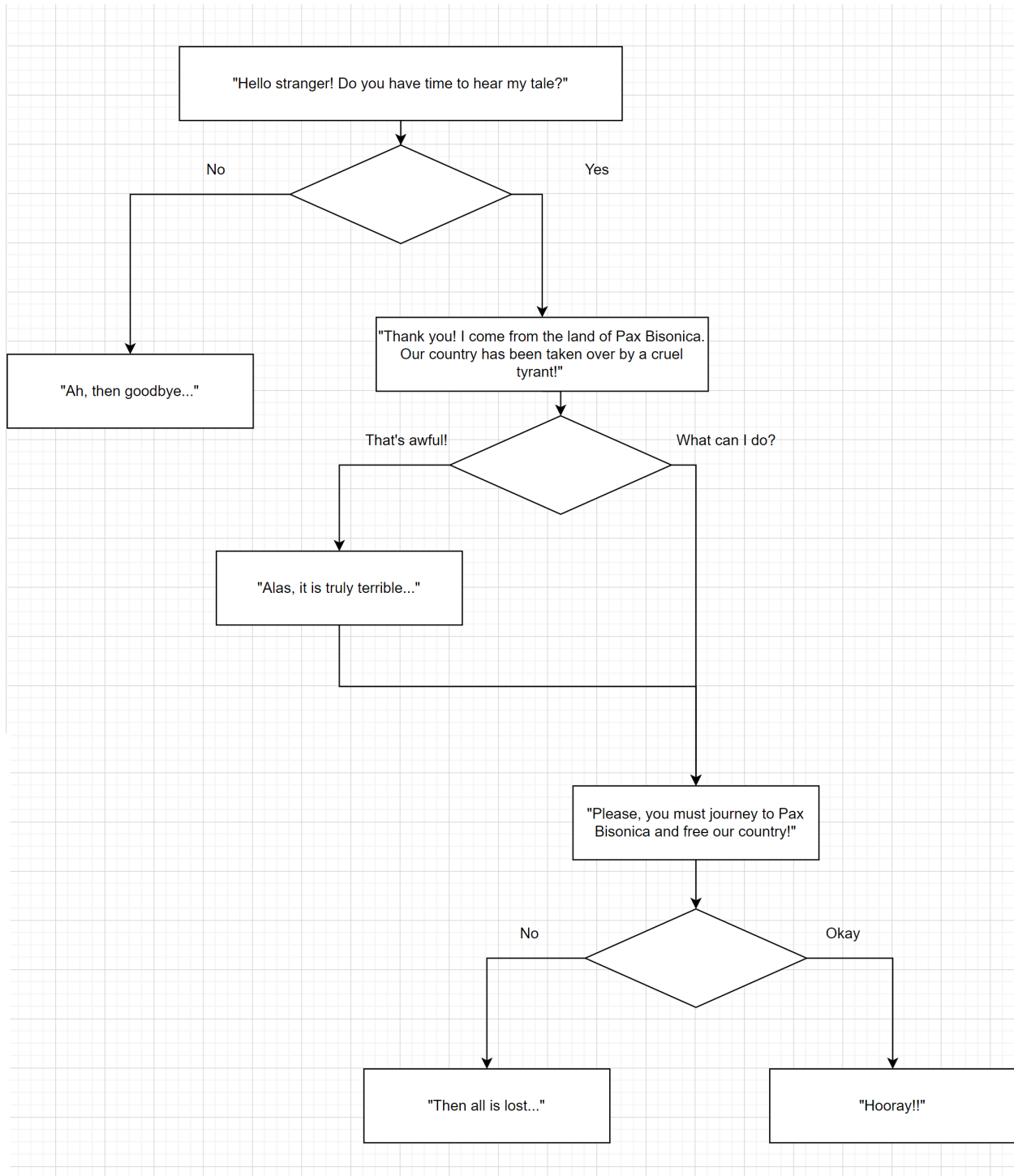5) Solve problems of increasing complexity

Overview: For this assignment, you're going to practice making decisions in your code. It's because of those decisions that your program can behave differently depending on the values in your variables; these decisions are called **conditional statements**. In practical terms, this means you're going to expand on the concepts from assignment 1 and 2, but also include things like IF, ELSE IF, ELSE and SWITCH statements. You'll also work with something called **compound conditionals**, which is just a fancy way of saying that you're going to use AND and OR operators (&& and ||). Again, start early, practice, and ask a lot of questions.

Follow the same conventions for class names and file names for your source code. For the Java folks, remove the "package" statement if you have one. Make sure to follow the FYE Submission Guidelines. Finally, we don't mean to lecture, but we want to remind you not to cheat. This is the core of what a lot of you will be doing for a living, so master it now.

Assignment3A:
Decision Trees: Many videos games and interactive stories use "decision trees" to allow for different dialogue based on the player's choices. For this assignment, you will create a (basic) dialogue system using **NESTED IF** statements. The diagram on the next page shows the different choices you can make, and the appropriate responses.

Note: The following diagram is a simplified form of UML – Unified Modeling Language. It is one way to display an algorithm so that people can understand it and implement it in code. For our purposes, the boxes show the printed prompts and responses. The diamonds indicate decisions after each prompt. For example, if I respond "No" to the first prompt, my program should print the response shown at the end of the "No" line on the diagram.

```
"Hello stranger! Do you have time to hear my tale?"
```

No   Yes

```
"Thank you! I come from the land of Pax Bisonica.
Our country has been taken over by a cruel
tyrant!"
```

```
"Ah, then goodbye..."
```

That's awful!   What can I do?

```
"Alas, it is truly terrible..."
```

```
"Please, you must journey to Pax
Bisonica and free our country!"
```

No   Okay

```
"Then all is lost..."
```
```
"Hooray!!"
```

You must call the class **Assignment3A** and put it in a file called "Assignment3A.java",
"Assignment3A.cs", or "Assignment3A.cpp"

Make sure to use <u>**nested IF statements**</u> to complete this assignment. Your program should
produce the following output based on different user input.
<u>Sample Output #1:</u>

[Epic Quest Simulator]
Hello stranger! Do you have time to hear my tale?
1) Yes
2) No
2
Ah, then goodbye...

Sample Output #2:
[Epic Quest Simulator]
Hello stranger! Do you have time to hear my tale?
1) Yes
2) No
1
Thank you! I come from the land of Pax Bisonica. Our country has been taken over by a cruel tyrant!
1) That's awful!
2) What can I do?
1
Alas, it is truly terrible...
Please, you must journey to Pax Bisonica and free our country!
1) Yes
2) No
1
Hooray!

Sample Output #3:
[Epic Quest Simulator]
Hello stranger! Do you have time to hear my tale?
1) Yes
2) No
1
Thank you! I come from the land of Pax Bisonica. Our country has been taken over by a cruel tyrant!
1) That's awful!
2) What can I do?
2
Please, you must journey to Pax Bisonica and free our country!
1) Yes
2) No
2
Then all is lost...

Assignment3B:
Martial Arts: One of the FYE instructors has a black belt. To earn this recognition, they first had to work their way through a variety of different colored belts.

For this assignment, you will create a program that prompts the user for their current belt grade. You will then use **Switch Statements** to determine what color belt they currently have, and whether it has a stripe on it. The rules to determine this information are listed below:

Grade	Belt Color	Number of Stripes
10	White Belt	0
9		1
8	Yellow Belt	1
7		2
6	Blue Belt	1
5		2
4	Green Belt	1
3		2
2	Brown Belt	1
1		2
0	Black Belt	0
[Anything Else]	No belt	*N/A*

You must call the class **Assignment3B** and put it in a file called "Assignment3B.java", "Assignment3B.cs", or "Assignment3B.cpp"
Make sure to use **Switch statements (**and only switch statements) to complete this assignment. Remember to take advantage of the unique property of switch statements.

Sample Output #1:
[Martial Arts Belt]
What belt grade are you? **6**
You have a blue belt,
with 2 stripes!

Sample Output #2:
[Martial Arts Belt]
What belt grade are you? **3**
You have a green belt,
with 1 stripe!

Sample Output #3:
[Martial Arts Belt]
What belt grade are you? **11**
You have no belt...

Assignment3C:

App Compatibility. You are interning at a mobile development company, and they're getting ready to release an exciting new update to their flagship app. Unfortunately, they had to raise the phone requirements needed to run it. They have tasked you with developing a simple program to help customers determine if they can update. You will write code that takes user input and determine if the app can run based on the following criteria:

- Apple devices require at least <u>iOS 12</u> or a device that <u>supports Bluetooth Connections</u>
- Android Devices require at least <u>version 11</u> or a device that <u>supports Augmented Reality (AR)</u>

This assignment requires you to use <u>at least one **compound IF statement**</u>. This means you must write an IF statement that connects two (or more) clauses with either AND/OR.

You must call the class **Assignment3C** and put it in a file called "Assignment3C.java", "Assignment3C.cs", or "Assignment3C.cpp"

<u>Sample Output #1:</u>
[App Checklist]
What mobile device do you have? **Windows Phone**
I'm sorry, our app does not support your device.

<u>Sample Output #2:</u>
[App Checklist]
What mobile device do you have? **Android**
What version do you have? **12**
Congratulations, you can run the app!

<u>Sample Output #3:</u>
[App Checklist]
What mobile device do you have? **Apple**
What version do you have? **6**
Does your device support Bluetooth connections? **No**
I'm sorry, our app does not support your device.

<u>Sample Output #4:</u>
[App Checklist]
What mobile device do you have? **Android**
What version do you have? **9.1**
Does your device support Augmented Reality? **Yes**
Congratulations, you can run the app!

Submission:

1. You will submit 3 separate files containing source code – one for each of the assignments above. Make sure the files are named correctly and to include the header with your name and course section listed.
2. Upload all 3 files (simultaneously) to the assignment submission folder in <u>Gradescope</u>.
3. We'll continue to work with you on this assignment if something messes up, so long as you submit by the due date. However, start early because we work during the weekday.

<u>APPENDIX – Examples of testing string equality in Java, C# and C++</u>

```java
//========= Java ==========
import java.util.*;
class Assignment3 {
  public static void main(String[] args) {
    Scanner scan = new Scanner (System.in);
    String userInput;
    System.out.println ("Enter something:");
    userInput = scan.nextLine();
    if (userInput.equals("Bob")) {
      System.out.println ("You typed Bob");
    }
    else {
      System.out.println ("You didn't type Bob");
    }
  }
}
```

```csharp
//========= C# ============
using System;
class Assignment3 {
  public static void Main (string[] args) {
    string userInput;
    Console.WriteLine ("Enter something:");
    userInput = Console.ReadLine();
    if (userInput.Equals("Bob")) {
      Console.WriteLine ("You typed Bob");
    }
    else {
      Console.WriteLine ("You didn't type Bob");
    }

  }
}
```

```cpp
//========= C++ ============
#include <iostream>
#include <cstdlib>
#include <string>

using namespace std;

int main() {
  string userInput;
  cout << "Enter something:" << endl;
  getline (cin, userInput);
  if (userInput.compare("Bob") == 0) {
    cout << "You typed Bob" << endl;
  }
  else {
    cout << "You didn't type Bob" << endl;
  }
}
```