SRC Assignment: **Why plant trees?**

Part A: CS0 assignment

Part B: CS1 assignment

What is SRC?

The "Socially Responsible Computing" assignments are designed to introduce ethics and social impact topics broadly to students so that students are familiar with these concepts when you are eventually faced with ethical design decisions further down your CS journey.

Learning Objectives

The following learning objectives are addressed by this assignment:

- L2: At the end of this assignment students should be able to evaluate computational artifacts to maximize their beneficial effects and minimize harmful effects on society.
- L3: At the end of this assignment students should be able to evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices
- L7: At the end of this assignment students should be able to reflect on the ways that computing can offer opportunities for achieving communal goals (and be able to define the ways computing can be used to reach these goals)

Pre reading and Discussions

Every year, more and more of our forests are affected by natural disturbances that cause deforestation. Wildfire, insects and disease - exacerbated by climate change - are jeopardizing the future of our forests. Planting trees helps restore forest cover, ensuring that our forests can continue to provide wildlife habitat, supply water to millions of Americans, and help fight climate change.

Please watch the following YouTube video, to notice why we need trees.

- $https://youtu.be/UnwMq1gGjhk$

Some important plant characteristics are:

- **size**: Knowledge of the tree's approximate mature size can prevent overcrowding, interference with overhead utility wires, and other problems. A mature height of fewer than 15 feet is recommended for trees planted near power lines.
- **hardiness**: hardiness zone is a geographic area defined as having a certain average annual minimum temperature, a factor relevant to the survival of many plants. California is divided into seven growing zones $(5, 6, 7, 8, 9, 10, 11)$ with average minimum temperatures ranging from -20 to 45 F.
- **soil conditions**: Most trees and shrubs grow well in soils with a pH of 5 to 7.5 (although there are some exceptions). Soils in California generally range in pH from 5 to 8.5, but most are higher than pH 7.

Careful plant selection can create an attractive landscape and prevent future maintenance problems.

Assignment - Part A

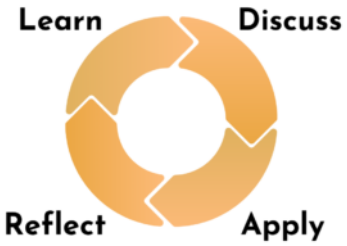
Here is some information on different tree types:

- Oak Tree:
  - 40-80 feet
  - They can grow well through zones 9 and 10
  - Oak trees prefer soil that is more acidic, generally between 5.06 to 7.0.
- Tuscarora Crape Myrtle Tree:
  - 10-14 feet
  - Tuscarora Crape Myrtles grow in zones 7-11. These trees prefer full sun, but can tolerate some shade and are adaptable to just about any soil as long as it is well-draining
  - Tuscarora Crape Myrtles trees prefer soil that is more acidic. Generally, pH ranges from 5.0 to 7.5. An acidic soil of 6.5 is ideal.
- Compact Italian Cypress:
  - 25-30 feet
  - Tuscarora Crape Myrtles grow in zones 7-10.
  - Generally, pH ranges from 5.0 to 6.5.
- Cold Hardy Tree:
  - 8-10 feet

- Cold Hardy Trees grow in zones 4.
- Generally, pH ranges from 5.5 to 6.5.

Question 1: Write a program to get the name of the tree (Oak, Tuscarora Crape Myrtle, Compact Italian Cypress, Cold Hardy) from the user and prints if it is a good choice to be planted in California:

1. in areas close to power lines.
2. in areas far from power lines.



Question 2: What problems are caused when forests are affected by natural disturbances?
Question 3: Whether you're an individual, a family, or a business, everyone has a role to play in protecting our planet. How can you contribute?

Pre reading and Discussions

A wildfire is an unplanned, uncontrolled and unpredictable fire in an area of combustible vegetation starting in rural and urban areas. California has dry, windy, and often hot weather conditions from Spring through late Fall that can produce moderate to severe wildfires. Wildfires in California are growing more dangerous because of the accumulation of wood fuel in forests, higher population and greater electricity transmission and distribution lines. At times, these wildfires are fanned or made worse by strong, dry winds, known as Diablo winds when they occur in the Northern part of the state and Santa Ana winds when they occur in the South.
California is one of the places having the most deadliest and destructive wildfire seasons.

Please watch the following YouTube video, to learn more about wildfires.

- $https://youtu.be/5hghT1W33cY$

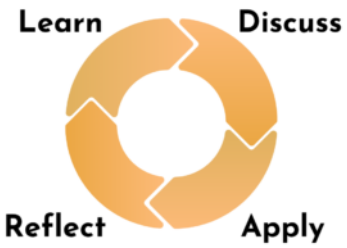
Refer to the link below and download the csv dataset which is about the California wildfire in 2017. Note that the forth column shows the county name:

- $https://github.com/CornellCAC/CVW_PyDataSci1/blob/master/data/wildfires/Fires_100.xlsx$

Assignment - Part B

Question 4: Write a program to:

- Load A CSV file using OpenCSV library .
- Extracts and prints each row of data.
- Accept an area name (4th column) from the user and report how many times wildfire occured in that area.



Question 5: How do California wildfires affect the economy in California?
Question 6: How can we stop wildfires?

Project 2: Notes and Requirements

General Information

Functionality Testing

To make sure your program works as intended, compile and run the program multiple times using different user input each time.

Notes on genAI usage:

You're encouraged to use an AI tool while writing your code. For example, you may want to ask it to explain a concept related to your program, such as what operator to use to check if two values are equal. Or, if you find you have a syntax error, you could leverage genAI as part of your debugging process.

GenAI prompting suggestions

If you get stuck and want to try asking an AI tool for help, here's some example prompts you might want to try.

- In Java, if I want to perform a calculation with user input, what data type must that user input be in?
- How can I perform string concatenation and calculations within a single `System.out.println()` statement in Java?
- How is `System.out.print(...)` different from `System.out.println(...)`?
- How can I read specific columns from a CSV file in Java?
- How can I use Scanner in Java to read data from files?

Explain your work

A final part of the project is to explain your work and demonstrate your understanding of the program you created.

You will share your explanation in a 5-minute video after creating a detailed outline of the points that you want to make.

Specifically, you must explain the following:

- The intended functionality of the program.

- Your process and the steps you took to design and develop this program

- How the code executes in one of your most complex sections.
- The lessons you learned through this project

Each part should be at least 1-minute long. You can use a standard cellphone or webcam to record your video.

Deliverables and Evaluation Criteria

You will be responsible for the following deliverables. The weighting of each component is indicated below. It's important that you refer to the Project Rubric for detailed information about how each deliverable will be evaluated.

Checkpoint (10%)

The following deliverables must be shared with a TA in an in-person meeting by the checkpoint date:

- A brief description of the program's focus and the final results users will get
- How you intend to represent the tree type data.
- How you intend to parse column data from the spreadsheet file.

Code submission (60%)

You must submit your code by the due date. *Please ensure it's possible to compile and successfully run your Java program!*

Explanation (30%)

You must submit your video containing your explanation along with your detailed outline by the due date.