California State University, Sacramento
College of Engineering and Computer Science

Computer Science 35: Introduction to Computer Architecture

Fall 2022 – Lab 4 – *Sutter's Mill*

Overview

The year is 1848. Due to the success of Sutter's Fort, the new town of New Helvetia (which would later be called Sacramento) is growing at an exceptional rate. This leads to some unique problems that John Sutter needs to solve. In particular, people need wood: cut wood. Homes, barrels, and wagons require cut tinder.

So, how do you create cut tinder in the wilderness of California? The solution is to the use the force of nature itself.

John Sutter just hired James Marshall to create a sawmill in Coloma. This located is the mountains, along the American River, between modern day Auburn and Placerville.

The idea is simple, use the flow of the river to power an enormous saw blade. Trees would be cut locally, cut at the mill, and then sent downstream to New Helvetia. So, the American River is both the source of power and the transportation. They were quite clever back then.

You have been sent up to The Mill to maintain the books. You are going to hire workers to fulfill a weekly quota.
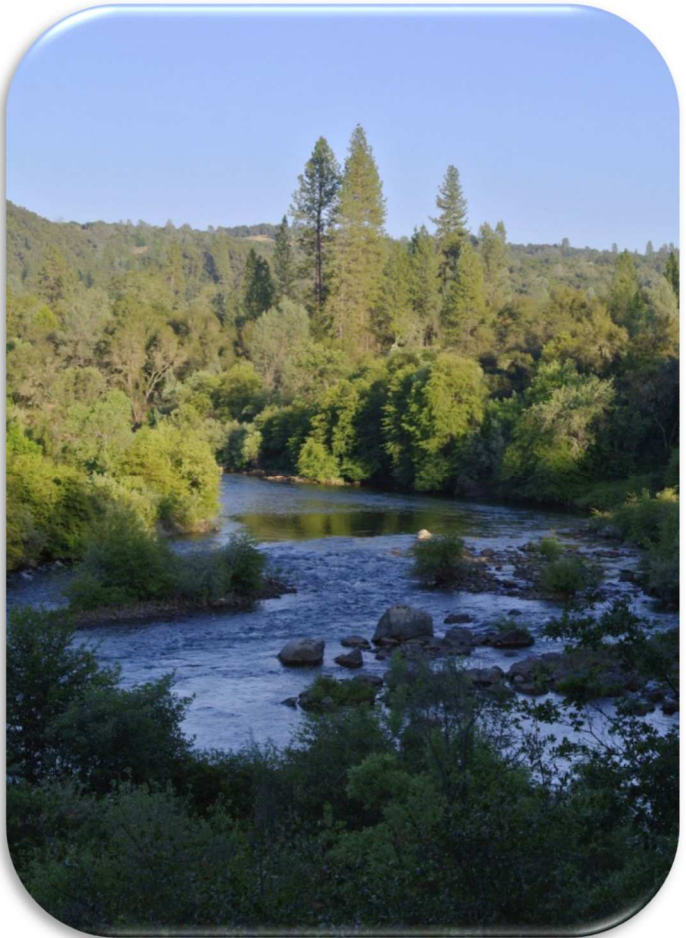
Your Task

You are going to create a program determines if the workers have fulfilled their contract.

The program will input the total number of trees that were cut down. Some of the trees will be rejected for use (perhaps they were not straight enough) and some will be lost in the river (if they float past The Mill, you won't get them back).

> **Total = Cut Down – Rejected – Lost**

Once your program computes the total, it will use conditional logic to print if they workers fulfilled the contract. For this, you will have to use conditional logic.

Sample Run

The following is a sample run of the program. The user's input is printed in **blue**. The data outputted from your calculations is printed in **green**.

Example 1

```
Sutter's Mill Contract                                    Title

How many trees were ordered?
7
How many trees were cut down?
18
How many trees were rejected?                   Prompt and input
9
How many trees were lost down the river?
1

They harvested 10 trees.                     Display if the contract
                                                was fulfilled
They SUCCESSFULLY fulfilled the contract!
```

Example 2

```
Sutter's Mill Contract

How many trees were ordered?
8
How many trees were cut down?
12
How many trees were rejected?
4
How many trees were lost down the river?
3

They harvested 5 trees.

They FAILED to fulfil the contract!
```

Photo of Sutter's Mill in 1950.

Hint

You will turn in the final program, but incremental design is best for labs.

1. First get the mathematics working correctly – so it displays the total trees harvested.

2. Now, work on the If Statement.

Requirements

You must think of a solution on your own. **You can come up with your own theme and categories.** You don't have to use mine. The requirements are as follows:

1. Display the title

2. Input the contract requirement. Display a prompt.

3. Input the trees cut down. Display a prompt.

4. Input the number of trees rejected and lost. Display a prompt for each.

5. Compute and output the total trees harvested.

6. Display if they fulfilled the contact. You need conditional logic.

Submitting Your Lab

To submit your lab, you must run Alpine by typing the following and, then, enter your username and password.
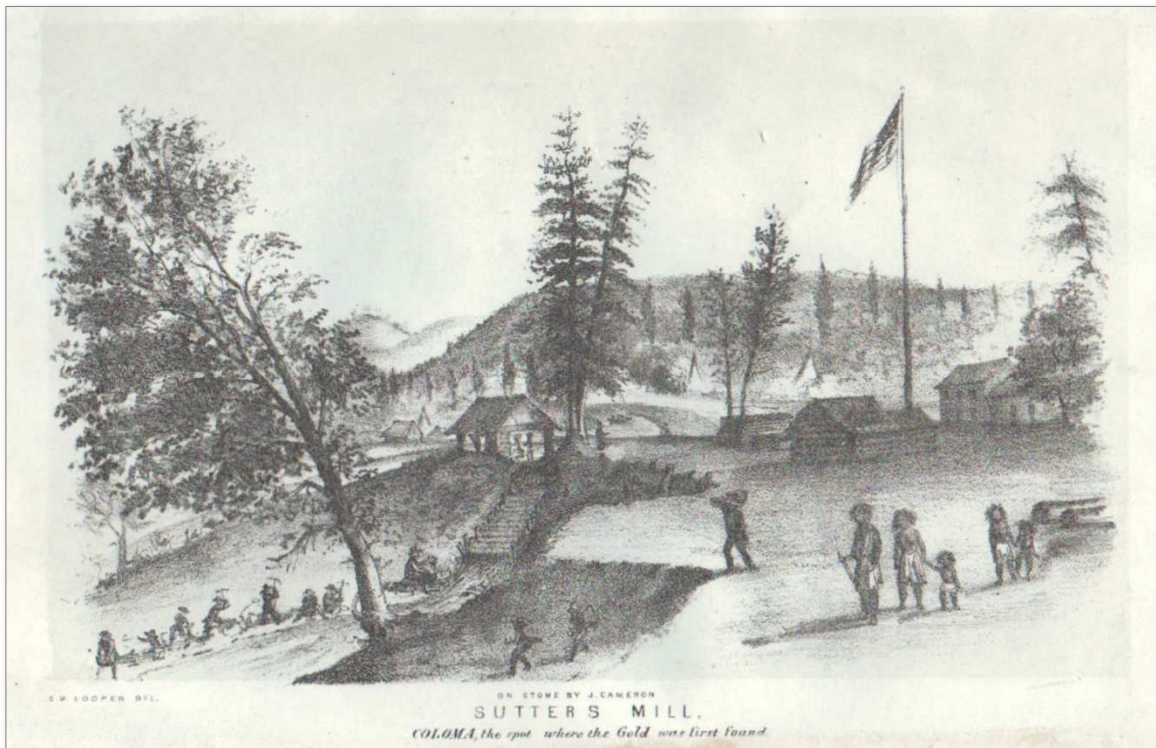
```
alpine
```

To submit your lab, <u>send the assembly file</u> (do <u>not</u> send the a.out or the object file to:

```
dcook@csus.edu
```

> ⚠️ **This activity may only be submitted in Intel Format.**
>
> **Using AT&T format will result in a zero. Any work from a prior semester will receive a zero.**

ON STONE BY J. CAMERON
SUTTERS MILL,
COLOMA, the spot where the Gold was first found

UNIX Commands

Editing

Action	Command	Notes
Edit File	**nano** *filename*	"Nano" is an easy to use text editor.
E-Mail	**alpine**	"Alpine" is text-based e-mail application. You will e-mail your assignments it.
Assemble File	**as –o** *object source*	Don't mix up the *objectfile* and *asmfile* fields. It will destroy your program!
Link File	**ld –o** *exe object(s)*	Link and create an executable file from one (or more) object files

Folder Navigation

Action	Command	Description
Change current folder	**cd** *foldername*	"Changes Directory"
Go to parent folder	**cd ..**	Think of it as the "back button".
Show current folder	**pwd**	Gives the current a file path
List files	**ls**	Lists the files in current directory.

File Organization

Action	Command	Description
Create folder	**mkdir** *foldername*	Folders are called directories in UNIX.
Copy file	**cp** *oldfile newfile*	Make a copy of an existing file
Move file	**mv** *filename foldername*	Moves a file to a destination folder
Rename file	**mv** *oldname newname*	Note: same command as "move".
Delete file	**rm** *filename*	Remove (delete) a file. There is **no** undo.