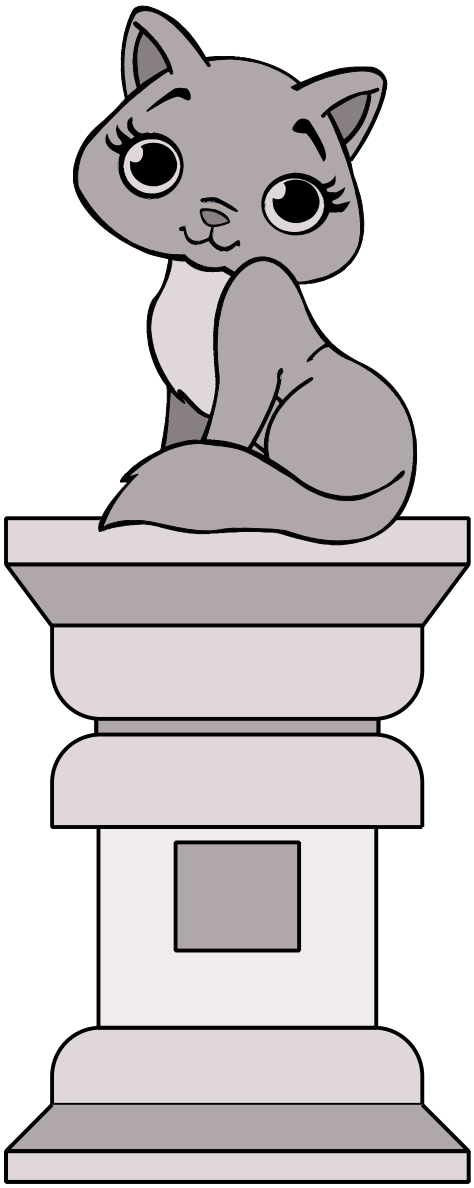
California State University, Sacramento
College of Engineering and Computer Science

Computer Science 35: Introduction to Computer Architecture

Fall 2022– Lab 4 – *Sorting Hat Waiting-Room*

Overview



When students first arrive at ***Hogwarts School of Witchcraft and Wizardry***, they are sorted into one of the four great houses: Gryffindor, Ravenclaw, Hufflepuff and Slytherin. This is accomplished with an ancient relic called the Sorting Hat.

But, before you get to enter The Great Hall and learn your fate, you must wait for… what seems like an eternity… in a rather-pleasant antechamber.

The room is full of a jittering crowd of stressed and excited students. Some students are pacing nervously; others are relaxing in one of the, many, soft poofs that line the room. Several students are arguing about the four houses.

"What is if get put in Slytherin?"

"Slytherin's okay. My uncle's in it. He's nice. Sneaky git, though, he is."

"Hufflepuff seems nice. But my Auntie Gizma's got a pet badger. That thing hates me. It's always trying to take a nip outta me. Will that matter?"

"But, what if I don't get in a house? What if none of 'em want me?"

This isn't helping and you wish the lot of them would shut up. You are beginning to worry. What if *you* don't find a house? What is the Sorting Hat simply tells everyone "Sorry, this muggle-born wizard is more muggle than wizard. Put them back on the train."

Your nerves have reached the breaking point, and droplets of sweat are creeping down your forehead. Then, quite softly, a voice says "Oh, you look so stressed little human kitten. Can I help?" You swing around.

There is no one there. The only thing that you can see, besides a huge stone wall, is an eloquently crafted statue of a cat sitting upon a large pedestal. You take a moment to read the golden plaque affixed to the pedestal. It reads "Ninji the Nice".

The statue then turns its head to face you. Yes, it moved! The statue blinks its eyes and speaks. "Please, don't worry. Do you want to talk?"

"Um… sure. How are you… Ninji is it?"

The statue smiles benignly. "Do you have a wand yet?"

"Oh yes. I got it in Diagon Alley last month. 11 inches with a dragon-heart string core!"

The statue looks at your wand and nods approvingly. "Are you afraid of what house you will be sorted into?"

"Yes. I am really am."

The statue's tale swishes gently. "Ah, yes. Most human kittens are. Are you a muggle-born?"

"Yes. I… I… don't know if I should be here!"

Ninji's face looks gently into your eyes. "Well, that doesn't matter. Some of the best wizards are muggle-born. The Minister of Magic, Hermoine Granger, is one. She likes cats too. Please don't worry. Here… have some calming chocolate cocoa. It'll help."

With a slight popping sound, an orange cup of steaming hot chocolate appears in a nook of the statue's pedestal. Your hands trembling, you take a gulp of the rich chocolate cocoa, and like a candle being blown out, your nerves become calm.

Your task

So, how does Ninji The Nice determine that a student is too stressed? She asks them a few yes/no questions and, if the answer is the stressful one, she adds a value to a running total.

When she is done asking questions, she looks at the sum. Then, Ninji The Nice either dipenses some delicious, calming, magical hot chocolate or, instead, a few kind words of encouragment.

Sample Run

The user's input is printed in **blue**. Questions that add points to the running total are marked with red arrows. The data outputted from your calculations is printed in **green**.

Note that all the questions add up to 100.

```
Did you get an animal pet? (1=yes 2=no)?
2

Are you afraid of what house you will be sorted into? (1=yes 2=no)?
1

Are you a muggle-born? (1=yes 2=no)?
2

Oh, did you get a wand yet? (1=yes 2=no)?
1

Your total stress level is at 45

You are going do fine student! Keep your chin up!
```

+15 points

30 points (wasn't added)

+30 points

25 points (wasn't added)

Here is a second student, who is a tad more stressed. In this example, the student over 50% is given some magical calming hot chocolate (cocoa).

```
Did you get an animal pet? (1=yes 2=no)?
1

Are you afraid of what house you will be sorted into? (1=yes 2=no)?
1

Are you a muggle-born? (1=yes 2=no)?
2

Oh, did you get a wand yet? (1=yes 2=no)?
2

Your total stress level is at 55

Oh dear! You are so stressed! Here! Have some magical calming hot cocoa!
```

+30 points

+25 points

Have Fun!

Don't have to use the Harry Potter theme. You can create your own stress program with your own questions, point values, and conditional messages.

The following are some, possible, categories.

- Stress of failing an exam.
- Stress of giving a presentation.
- Stress of getting into an auto accident.
- Stress of getting "pwn'd" in a video game.
- Stress of getting explosive diarrhea at a party.
- etc...

Tips

- The **rdx** register is used by the library to input data and output results.
- Use another register (or .quad in the data section) to store a running total.
- Look at the following Java code. Notice that you don't add to the running total if the condition is false. So, you should jump over the add logic, if false. You will need a label to jump to. You don't have to use these variable names (it is just an example).

```
if (answer == 1)
{
   total += 30;
}
```

This is the muggle-born question (30 points)

- Work in your program in parts. Get one if-statement to work, print the running total (remember to put the value want to print in rdx).

Requirements

You must think of a solution on your own. The requirements are as follows:

1. Prompt the user for each question.
2. Input the user's input for each question.
3. Use if statements to add points to a running total (depending on their answer).
4. At least 4 questions.
5. Use an If-Else at the end to display one of two messages.

Submitting Your Lab

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.

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

```
alpine
```

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

```
dcook@csus.edu
```

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.