

Harry Potter Sorting Hat

2020 Skills USA Programming Competition

A programming exercise based on the plot of the Harry Potter franchise, specifically regarding the Sorting Hat and incoming students to Hogwarts.

Requirements

Incoming students received invitation letters to Hogwarts and are gathered in the banquet hall to be sorted into their houses. Complete the following three phases to help the Sorting Hat group the students. Get as far as you can while still having working, separate solutions for each previous phase.

Phase 1

Seed the application with 20 incoming Hogwarts students (names provided below), in the order provided.

Program a Sorting Hat algorithm to sort the students evenly into the four houses (five students per house) and display the resulting list of students alphabetically (A to Z) by the student's first name, grouped by their respective house.

Note: For phase 1, it does not matter in which house a particular student is sorted.

Seed Data

Houses

House
Gryffindor
Hufflepuff
Ravenclaw
Slytherin

Students

ID	Student
01	Sam Roots
02	Wayman Fledgling
03	Lyle Falcon
04	Ada Dogwood
05	Phillip Filly

ID	Student
06	Alberto Fern
07	Oak Cobweb
08	Alfalfa Nightshade
09	Frost Cycad
10	Birch Slumber
11	Thyme Rubble
12	Jo Marble
13	Taylor Hatch
14	Clem Beetle
15	Eli Barrows
16	Snow Lambkins
17	Delta Cups
18	Breeze Littletree
19	Shell Bags
20	Azure Soots

Phase 2

After ensuring you have a successful and complete solution for Phase 1, enhance your Sorting Hat algorithm to take qualities into account when determining to which house a student should be assigned.

Use the updated seed data below, in the order provided, to seed the 20 students with each student having three total qualities valued by houses at Hogwarts.

Sort the students into the house that matches two or more of the student's qualities. Display the resulting list of students alphabetically (A to Z) by the student's first name, grouped by their respective house.

Updated Seed Data

Houses

House	Qualities
Gryffindor	courage
	bravery
	nerve
	chivalry

House	Qualities
Hufflepuff	hard work patience justice loyalty
Ravenclaw	intelligence creativity learning wit
Slytherin	ambition cunning leadership resourcefulness

Reference: [Hogwarts Wikipedia](#)

Students

ID	Student	Qualities	Expected House
01	Sam Roots	ambition courage bravery	Gryffindor
02	Wayman Fledgling	courage patience loyalty	Hufflepuff
03	Lyle Falcon	ambition leadership justice	Slytherin
04	Ada Dogwood	creativity intelligence hard work	Ravenclaw
05	Phillip Filly	learning ambition intelligence	Ravenclaw
06	Alberto Fern	patience loyalty nerve	Hufflepuff
07	Oak Cobweb	chivalry courage resourcefulness	Gryffindor

ID	Student	Qualities	Expected House
08	Alfalfa Nightshade	cunning wit ambition	Slytherin
09	Frost Cycad	hard work creativity justice	Hufflepuff
10	Birch Slumber	learning creativity chivalry	Ravenclaw
11	Thyme Rubble	leadership cunning patience	Slytherin
12	Jo Marble	nerve justice chivalry	Gryffindor
13	Taylor Hatch	ambition bravery courage	Gryffindor
14	Clem Beetle	chivalry hard work loyalty	Hufflepuff
15	Eli Barrows	ambition creativity leadership	Slytherin
16	Snow Lambkins	courage leadership resourcefulness	Slytherin
17	Delta Cups	intelligence wit patience	Ravenclaw
18	Breeze Littletree	patience loyalty leadership	Hufflepuff
19	Shell Bags	intelligence nerve creativity	Ravenclaw

ID	Student	Qualities	Expected House
20	Azure Soots	bravery intelligence chivalry	Gryffindor

Phase 3

After ensuring you have a successful and complete solution for Phase 2, enhance your code to allow the end user to add more students, with three qualities each, and sort them with the initial 20 students appropriately.

Require three qualities per student. Each quality must match a quality from a house. Do not allow multiples of the same quality for the same student. Require a student name to be entered. Do not allow the student name to match an existing student.

Then allow the end user to re-assign an existing student to a different house.

Then allow the end user to expel a sorted student from Hogwarts (remove them from all houses).

Scoring Criteria

Does it Work	200
Completeness	50
Correctness of Output	50
Code Clarity/Documentation	50
Structure/Quality of Work	50
Efficiency of Code	40
Phase 2	30
Phase 3	30
Interview	0 to -30
Clothing/Appearance	0 to -30
Resume	0 to -30
TOTAL	500