

4. In this problem, you'll create a program that guesses a secret number!  
The program works as follows: you (the user) thinks of an integer between 0 (inclusive) and 100 (not inclusive). The computer makes guesses, and you give it input - is its guess too high or too low? Using bisection search, the computer will guess the user's secret number!

Here is a transcript of an example session:

```
Please think of a number between 0 and 100!
Is your secret number 50?
Enter 'h' to indicate the guess is too high. Enter 'l' to indicate the guess is too low.
Enter 'c' to indicate I guessed correctly. l
Is your secret number 75?
Enter 'h' to indicate the guess is too high. Enter 'l' to indicate the guess is too low.
Enter 'c' to indicate I guessed correctly. l
Is your secret number 87?
Enter 'h' to indicate the guess is too high. Enter 'l' to indicate the guess is too low.
Enter 'c' to indicate I guessed correctly. h
Is your secret number 81?
Enter 'h' to indicate the guess is too high. Enter 'l' to indicate the guess is too low.
Enter 'c' to indicate I guessed correctly. l
Is your secret number 84?
Enter 'h' to indicate the guess is too high. Enter 'l' to indicate the guess is too low.
Enter 'c' to indicate I guessed correctly. h
Is your secret number 82?
Enter 'h' to indicate the guess is too high. Enter 'l' to indicate the guess is too low.
Enter 'c' to indicate I guessed correctly. l
Is your secret number 83?
Enter 'h' to indicate the guess is too high. Enter 'l' to indicate the guess is too low.
Enter 'c' to indicate I guessed correctly. c
Game over. Your secret number was: 83
```

Your program should use bisection search. So think carefully what that means. What will the first guess always be? How should you calculate subsequent guesses? Hint: Your initial endpoints should be 0 and 100.

```
import java.util.Scanner;

public class BisectionSearch {

    public static void main(String[] args) {

        Scanner input = new Scanner(System.in);

        System.out.println("Please think of a number between 0 and 100!");

        int low = 0;
```

```
int high = 100;

int guess;

while (true) {
    guess = (low + high) / 2;
    System.out.printf("Is your secret number %d?\n", guess);

    System.out.println("Enter 'h' to indicate the guess is too high. Enter 'l' to indicate the guess is too low. Enter 'c' to indicate I guessed correctly.");
    char response = input.next().charAt(0);

    if (response == 'c') {
        System.out.printf("Game over. Your secret number was: %d\n", guess);
        break;
    } else if (response == 'l') {
        low = guess;
    } else if (response == 'h') {
        high = guess;
    } else {
        System.out.println("Sorry, I did not understand your input.");
    }
}
}
```