**Magpie Chatbot Lab: Student Guide**

**Activity 5 and 6: Arrays, ArrayLists and the Magpie**

When you last worked with the Magpie, default responses were handled with a nested if statement. This certainly worked, and you could add more responses, but it was a bit awkward. An easier way to keep track of default responses is with an array or an ArrayList. In this activity, you will see how an array and an ArrayList makes handling default responses much easier.

**Prepare**

Have available:

* the code from your Magpie4.java
* the code from the MagpieRunner4.java
* a computer with your Java development tools

Create a project and folder for your files named LastnameMagpieFiveSix

Name your copy of this word document LastnameMagpieChatbotFiveSix.dox.

**Exploration**

In this version of the code you will use a concept called code refactoring. You should see no difference in the outward behavior. Instead, the has been changed so that its internal structure is different. Again, this is called code refactoring. That’s one of the big benefits of dealing with methods as black boxes. As long as they perform the action required, the user does not care about how they perform the action.  Read the code for getRandomResponse. Notice that it uses an array of responses.

**Exercise  5**

Change the code in getRandomResponse to use an array instead of an if-else structure. Be sure to use the length when determine how many elements are in the array.

Alter the array to add four additional random responses. Notice that, because your modified getRandomResponse method uses the length attribute of the array, you do not need to change anything else.  Compile and run your code. You should run it until you see all of your new responses.

Zip your project for Exercise 5 and submit in Edmodo.

**Exercise  6**

Modify your code to use an ArrayList instead of an array.

**Questions**

Answer the following 2 multiple-choice questions below.

1. Consider the following code segment.

if (a < b) {

if (b < c) {

if (c < 10) {

System.out.println("one")

} else if (c < a) {

System.out.println("two")

}

}

} else {

if (c < a) {

System.out.println("three")

} else {

System.out.println("four")

}

}

For which values of a, b, and c will the code print “one”? \_\_\_\_\_a\_\_\_\_\_

I. a = 5, b = 6, c = 7

II. a = 8, b = 7, c = 6

III. a = 10, b = 20, c = 30

(A) I only

(B) II only

(C) III only

(D)  I and III

(E)  I and II

2. What is the output of the following code segment? \_\_\_\_\_\_\_\_a\_\_\_\_\_

String phrase = "Here is the word";

int psn = phrase.indexOf("e");

while (psn >= 0)

{

System.out.print(psn + " ");

phrase = phrase.substring(psn + 1);

psn = phrase.indexOf("e");

}

(A)  1 1 6

(B)  2 2 7

(C)  1 3 10

(D)  2 4 11

(E)  Many digits will be printed due to an infinite loop.

Zip your project for Exercise 6 and submit in Edmodo along with your Magpie Chatbot word document in the Magpie Chatbot Six assignment.

See the next pages for additional information.

**Current Work in NLP**

There is much work going on with Natural Language Processing in a variety of areas:

* Spam filtering uses NLP to determine whether an email message is spam.
* Many businesses use virtual agents to provide assistance to customers on Web sites.
* Information retrieval parses text, such as email messages, and tries to extract relevant information from it. For example, some email programs will suggest additions to online calendars based on text in the message.
* Sentiment analysis takes information retrieval further. Rather than extract information from a single source, it goes to a variety of online resources and accumulates information about a particular topic. For example, sentiment analysis might follow Twitter to see how people are reacting to a particular movie.
* Question answering systems search a large body of knowledge to respond to questions from users. The best-known question answering system is IBM’s Watson.

**Glossary**

API — An abbreviation for Application Programming Interface. It is a specification intended to be used as an interface by software components to communicate with each other.

Chatbot — A program that conducts a conversation with a human user.

Code refactoring — A disciplined technique for restructuring an existing body of code, altering its internal structure without changing its external behavior.

Magpie — Magpies are large black birds. They are thought to be among the most intelligent birds and are capable of mimicking human speech.

NLP — Natural Language Processing; the field that studies responding to, and processing, human language.

Virtual agent — Also known as an Intelligent Agent. This can be used to gather information from a customer so that appropriate action can be taken in response to a query.

**References**

**General information**

http://www.nlp-class.org. A free online NLP class from Stanford. The first video does a good job of explaining the problems and promises of NLP, although much of the material is at a much higher level.

http://nsf.gov/cise/csbytes/newsletter/vol1i4.html. An issue of the NSF Bits and Bytes Newsletter dedicated to NLP. Professor Mari Ostendorf of the University of Washington is featured in the newsletter.

**Some chatbots**

http://www-03.ibm.com/innovation/us/watson/what-is-watson/science-behind-an-answer.html. Numerous videos about the creation of Watson.

http://nlp-addiction.com/chatbot. Versions of the Eliza program, the first widespread chatbot.

**Women in NLP Research**

http://dotdiva.org/profiles/laura.html. A virtual nurse created by Laura Pfeifer.

http://people.ischool.berkeley.edu/~hearst. Professor Marti Hearst’s homepage. She researches user interfaces to search engines.