BYTES AND BEATS

An Introduction to Programming with MATLAB

Instructor Guide

Module 6: Practice with Indexing

Prerequisite Domain Knowledge: Variables, vectors, indexing

Expected Completion Time: 50 minutes

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Indexing Quiz

Expected Duration: 50 minutes

Learning Objectives

- Revisit vectors and indexing

Motivation

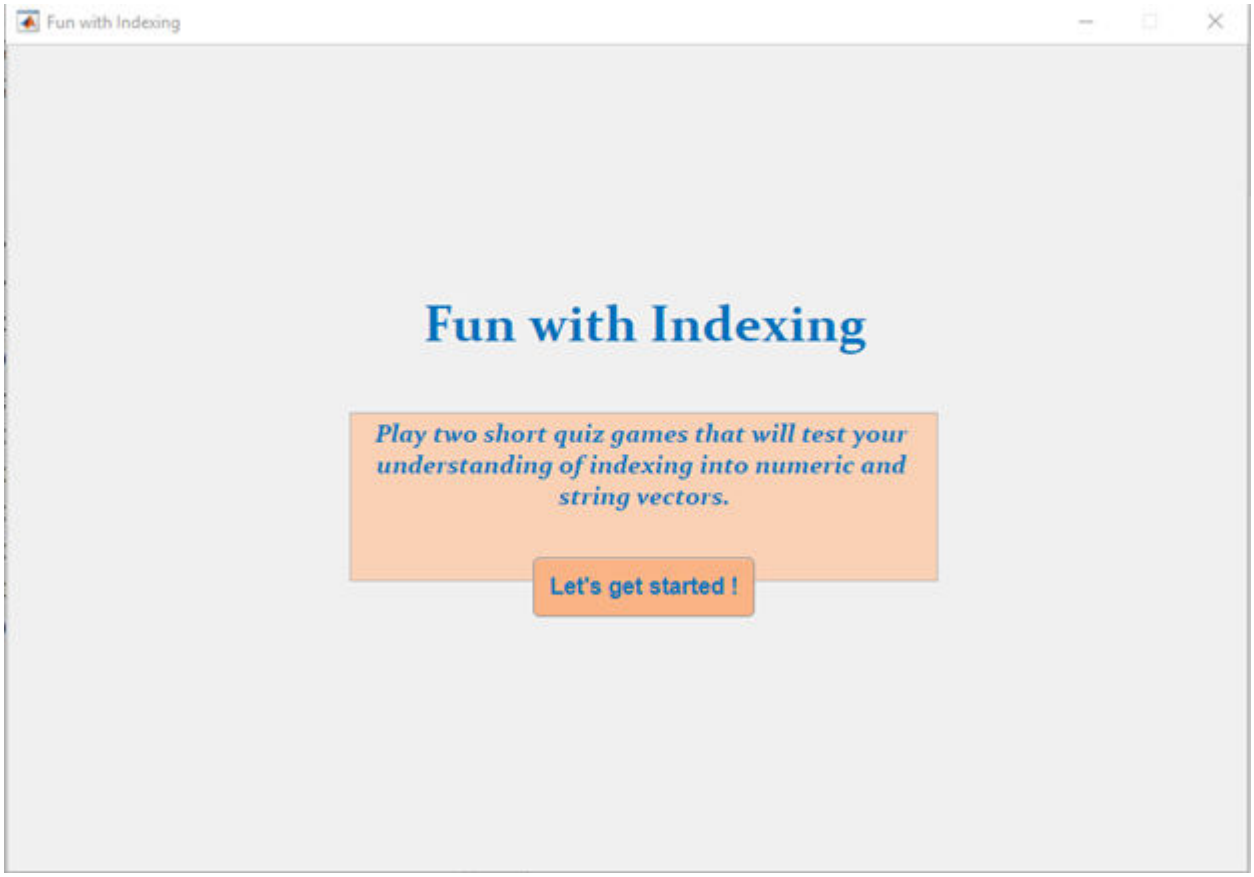
In this activity, students will practice the concepts of vectors and indexing in a quiz.

Materials

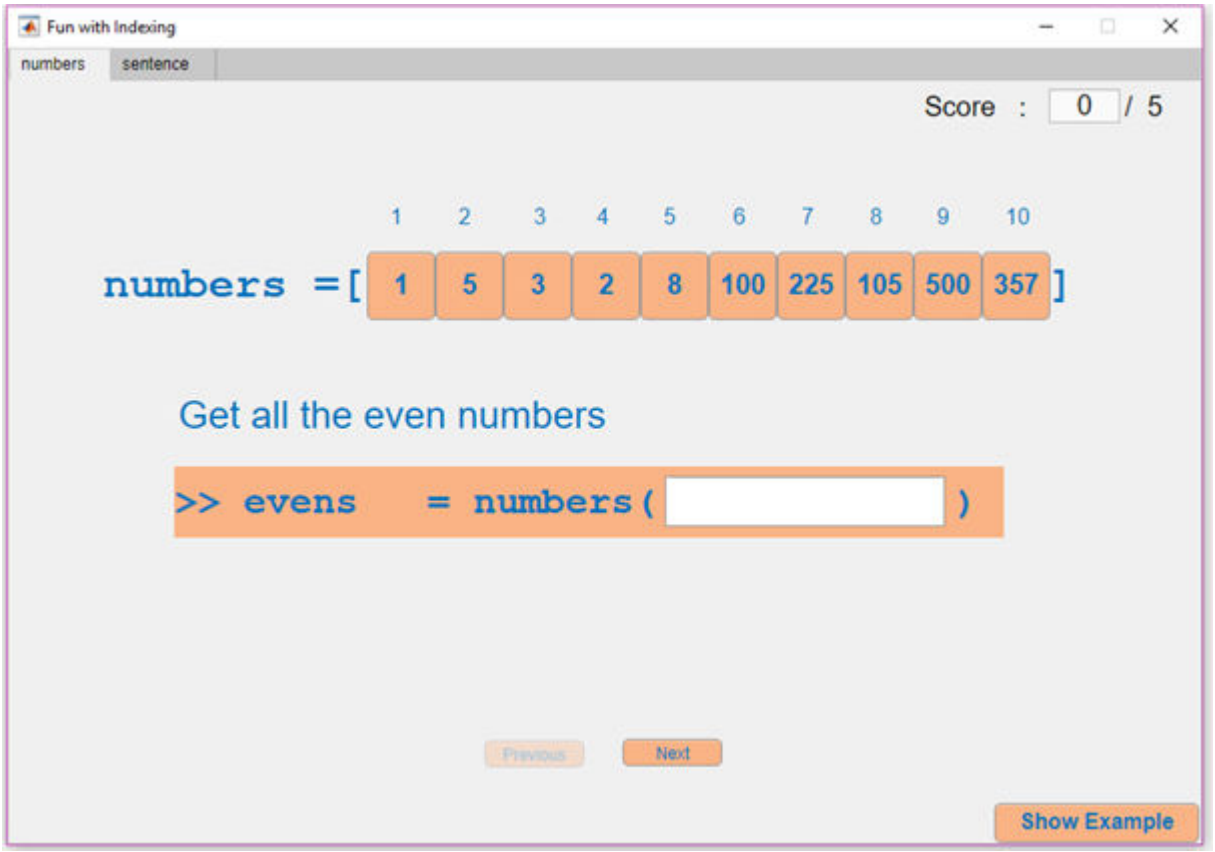
- MATLAB®
- Indexing Quiz App

Steps

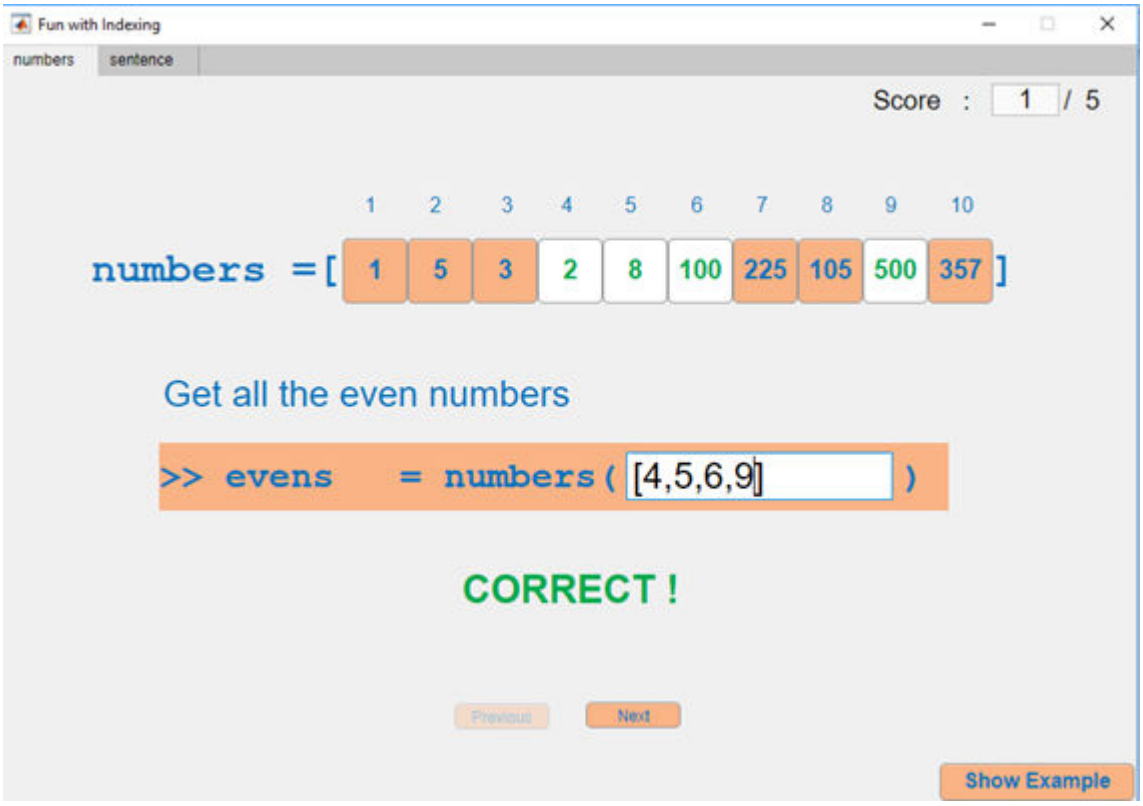
- Tell the students to go to the **APPS** tab and click on “Indexing Quiz”.
- This will open the app shown below:



• Click on the “Let’s get started!” button to start. You should see the screen below:



- There are two sets of quizzes. The first quiz set has a numeric vector called `numbers`. The students must fill in appropriate indexing in the text box to complete the command to get the desired numbers.
- For the first question, students need to index into all the even numbers.



- Please ensure that the students use square brackets to create a vector of indices, and use index values and not the actual even numbers. For example, the following would be incorrect:

- Once they answer a question correctly, the app moves to the next one. There are 5 questions in all. The solutions for each question are provided below.
- Students can click the “Show Example” button to see a sample question and its solution.
- Pressing enter after typing the answer in the text box will evaluate it.
- To navigate the questions, use the “Previous” and “Next” buttons.

Here are the solutions to the questions:

Note: There is more than one right answer for each question. Any order of indexing is allowed so long as the output vector contains the desired numbers. A space can be used in place of commas in MATLAB. The answers below are the best answers.

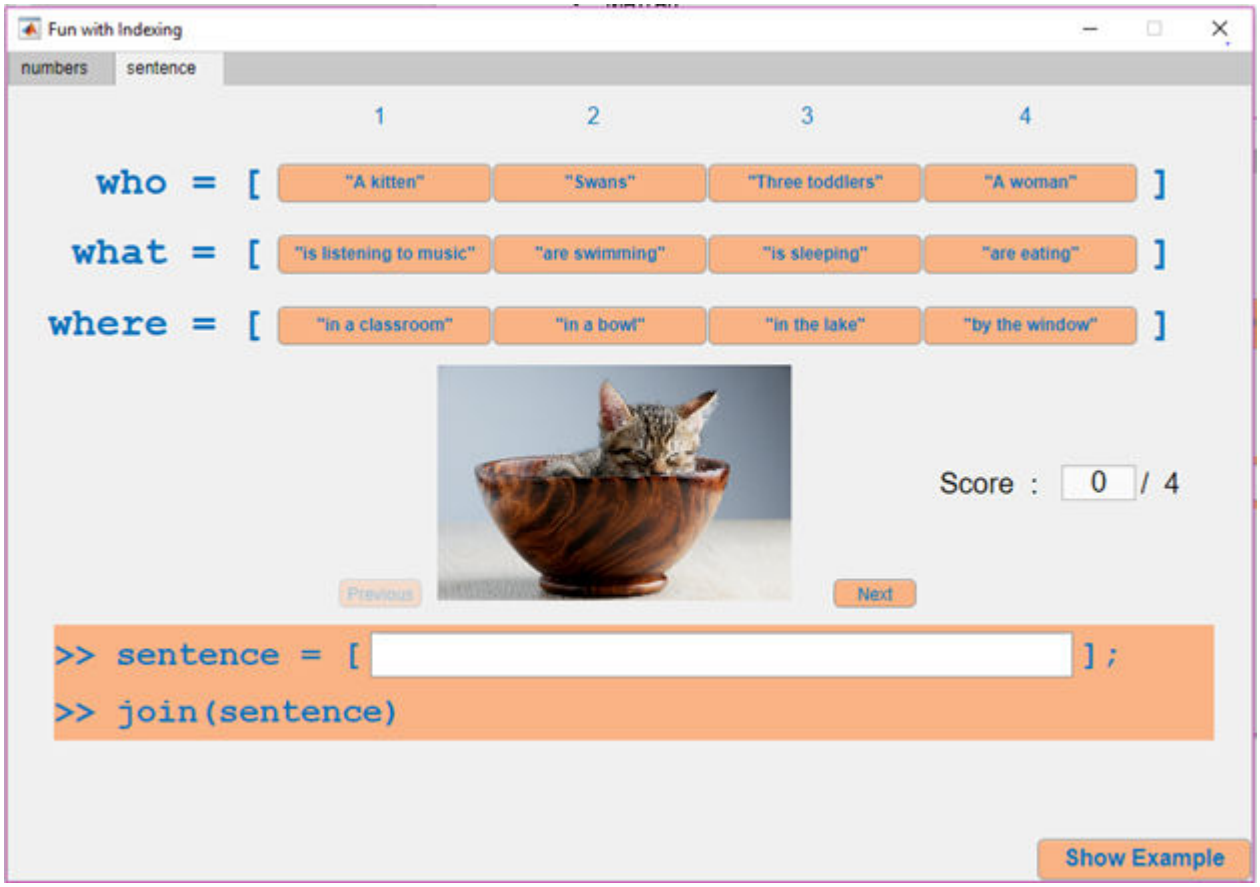
```
%Get all the even numbers
evens = numbers([4,5,6,9])
%or
evens = numbers([4 5 6 9])
evens = numbers([4:6 9])
%Get all the odd numbers
odds = numbers([1 2 3 7 8 10])
%or
odds = numbers([1:3 7 8 10])
%Get all the numbers greater than 50 ( Use : )
large = numbers(6:10)
```

Remind the students that colon operator (:) automatically creates a vector, so we don't need to use square brackets with it. Here is a quick example

```
%Get all the numbers less than 50 ( Use : )
small = numbers(1:5)
```

```
%Get all the numbers divisible by 5 (  Use , and : )
div5 = numbers([2 6:9])
```

After the last question, the students can move to the second quiz set by clicking on the tab called “sentence”.



- This quiz will reinforce understanding of string vectors and indexing.
- There are three string vectors - `who`, `what`and `where`. Students will see a picture on the screen. They must index into each of these three vectors and create a new vector – `sentence` – which describes the picture in a sentence.
- Students can click the “Show Example” button to see a sample question and its solution.
- Pressing enter after typing the answer in the text box will evaluate it.
- To navigate the questions, use the “Previous” and “Next” buttons.

Here are the solutions to the questions:

Note: The strings can be separated by space in place of commas. The order of who, what and where is important to form a coherent sentence. Space can be used in place of commas in MATLAB.

```
sentence = [who(1), what(3), where(2)]
"A kitten is sleeping in a bowl"

sentence = [who(2), what(2), where(3)];
"Swans are swimming in the lake"

sentence = [who(3), what(4), where(1)];
```

```
"Three toddlers are eating in a classroom"

sentence = [who(4), what(1), where(4)];
"A woman is listening to music by the window"
```

- If some students complete the quiz early, you can encourage them to try different answers for numbers game and to play with the sentence by trying out some fun combinations of who, what and where.
- Discuss the answers with the students.