

COMP/EECE 7012

Exam 1

Spring 2017

Name: Solutions, _____
Last name First name

Rules:

- No potty breaks.
- Turn off cell phones/devices.
- Closed book, closed note, closed neighbor.
- WEIRD! Do not write on the backs of pages. If you need more pages, ask me for some.

Reminders:

- Verify that you have all pages.
- Don't forget to write your name.
- Read each question carefully.
- Don't forget to answer every question.

1. [2pts] Which of these terms best describes Git?

- a) Issue Tracking System
- b) Integrated Development Environment
- c) Distributed Version Control System
- d) Web-Based Repository Hosting Service
- e) None of the above

2. [2pts] Which of the following problems does Git help solve?

- a) Recovering older versions of a software project
- b) Merging changes to a software project made by collaborating developers working in parallel
- c) Developing multiple versions of a software project in parallel
- d) All of the above
- e) None of the above

3. [2pts] Which of these terms best describes GitHub?

- a) Issue Tracking System
- b) Integrated Development Environment
- c) Distributed Version Control System
- d) Web-Based Repository Hosting Service
- e) None of the above

Consider the following list of Git commands:

- | | |
|---------------|-----------------|
| a) git init | f) git branch |
| b) git push | g) git clone |
| c) git add | h) git checkout |
| d) git merge | i) git status |
| e) git commit | j) git pull |

Zoe has just joined a team of developers collaboratively working on a social networking web app called *Friends4Ever*. The code for the project is housed in a GitHub repo. All work for the project is being done on the "master" branch (no other branches).

4. [2pts] Zoe wants to get a local copy of the code and repo, so she can begin contributing to the project. Which command(s) from the above list should she run?

g

5. [2pts] She makes some changes to the code. Which command(s) from the above list should she run to save her edits to the local repo?

c,e

6. [2pts] Having saved to her local repo, she would now like to share her work with the rest of the team (via GitHub). Which command(s) from the above list should she run?

b

When she runs the command(s), she gets this message (with words that give away the answers hidden):

```
To https://github.com/.../friends.git
! [rejected]      master -> master (fetch first)
error: failed to ████ some refs to 'https://github.com/.../friends.git'
hint: Updates were rejected because the remote contains work that you do
hint: not have locally. This is usually caused by another repository ████ing
hint: to the same ref. You may want to first integrate the remote changes
hint: (e.g., 'git ████ ...') before ████ing again.
hint: See the 'Note about fast-forwards' in 'git ████ --help' for details.
```

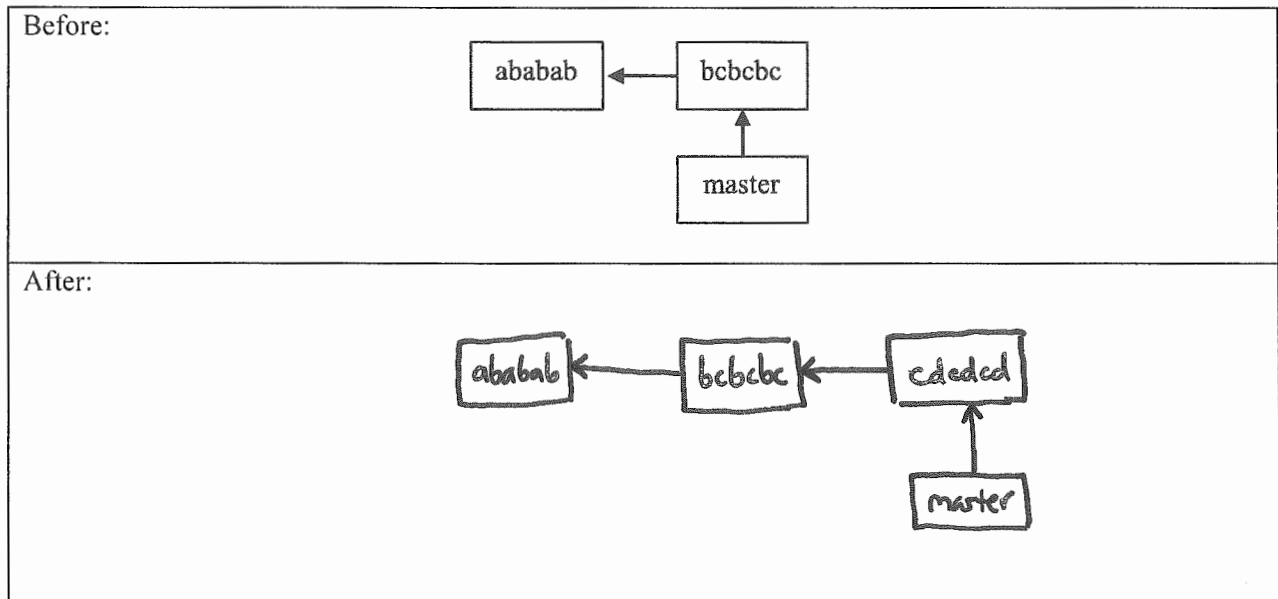
7. [2pts] Zoe wants to resolve this issue, so she can upload her changes. Which (one) command from the above list should she run next?

j

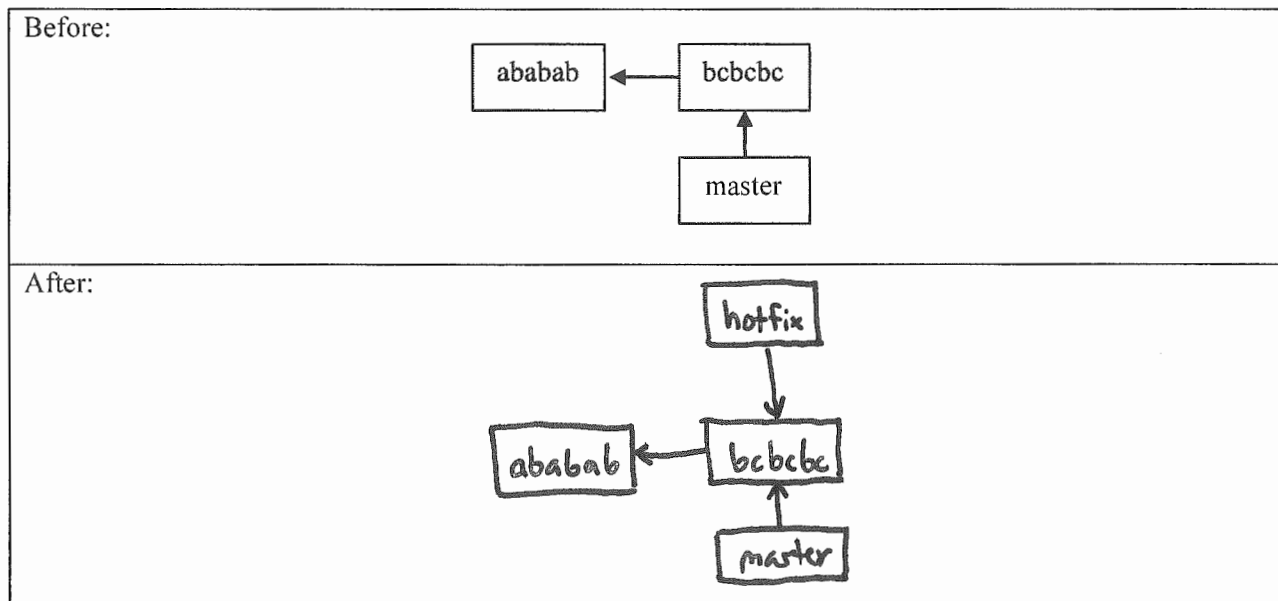
8. [2pts] The command completes with no conflicts. What command(s) should Zoe run to at last share her work with the rest of the team?

b

9. [4pts] Draw the state of the pictured repository after a Git **commit** operation (call your hash *cdeded*).

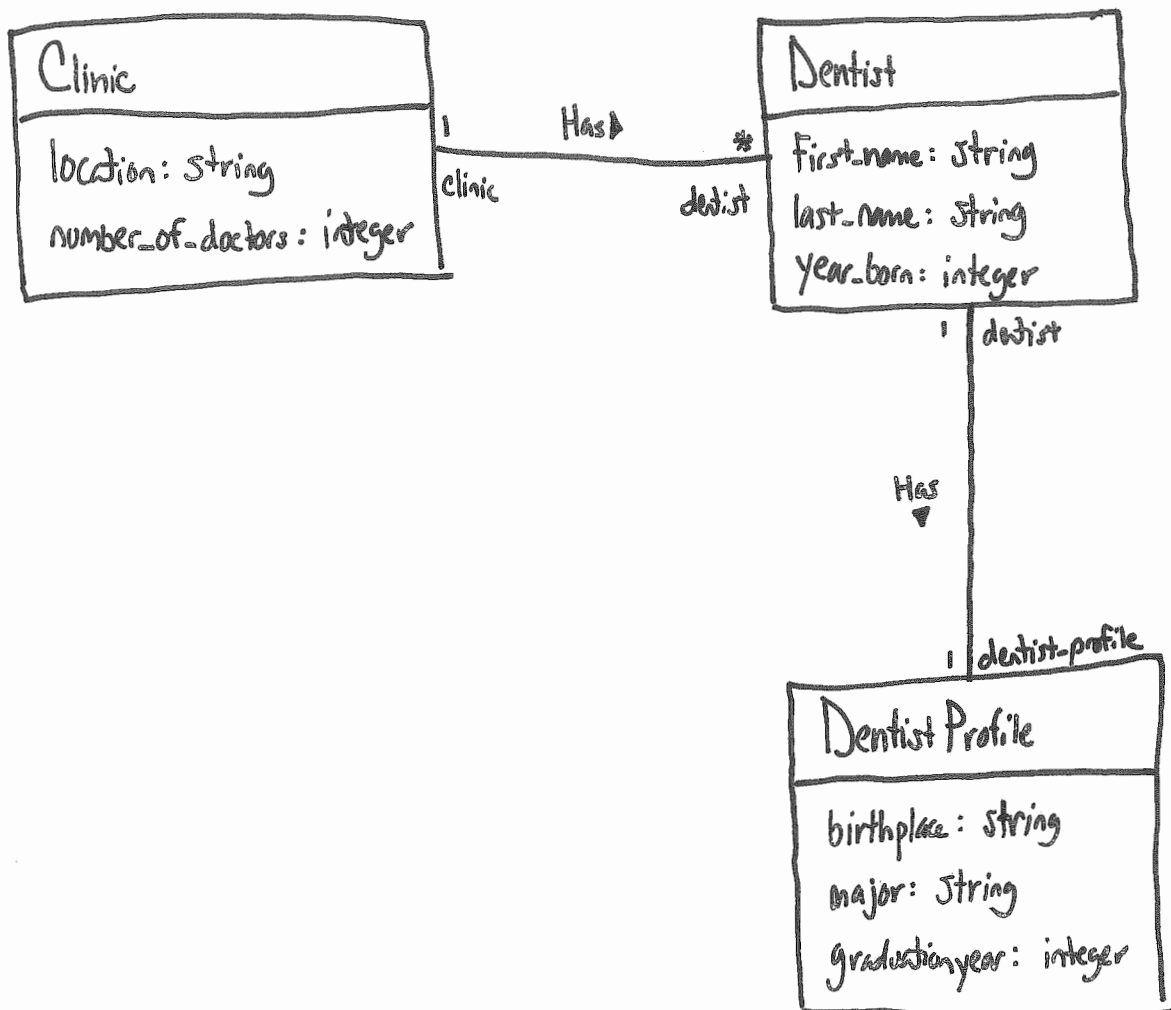


10. [4pts] Assuming that you have the latest version of the master branch checked out, draw the state of the local repository after running this command: `git branch hotfix`



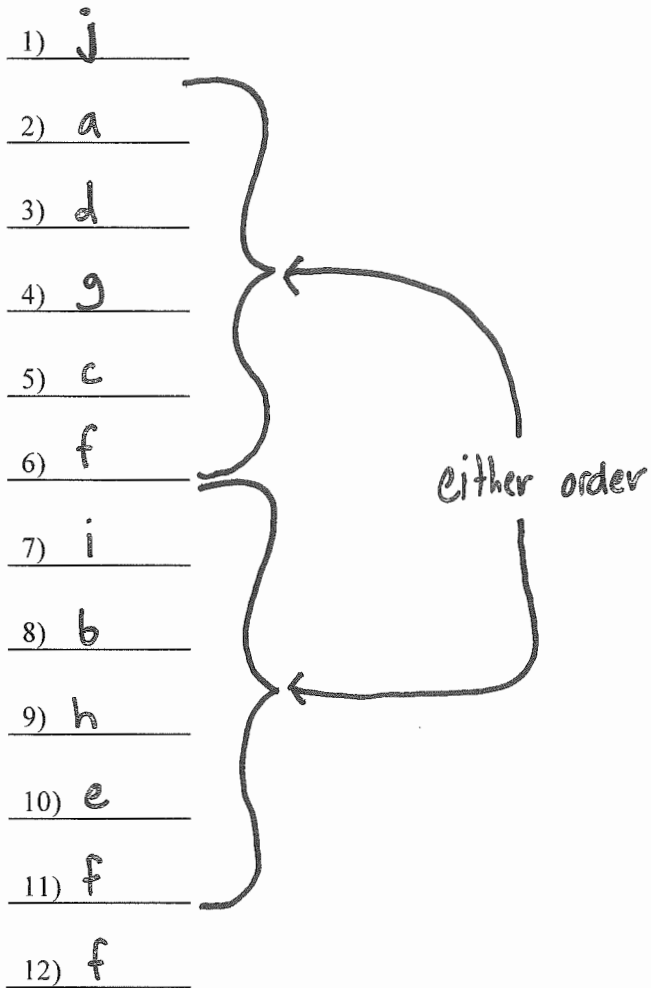
The questions on the following pages refer to the example figures. The figures show different aspects of the *find-a-dentist* web app that helps a patient to find a suitable dentist. Users can use the app to browse dentists and dental clinics, and to manage dentist and clinic data.

11. [10pts] Draw a UML class diagram that represents the three model classes given in Figure 1. Be sure to label all associations and association ends, and include all multiplicities. Don't include any "id" attributes (including foreign keys). You may also omit the "datetime" attributes that Rails provides by default.



12. [6pts] Consider the validations in the Dentist class (Figure 1) and the Hero fixtures in Figure 2. Using the following lines of code, create a class with two test cases—one that tests that last name is present and the other that tests that the dentist is at least 17 or 18 years in age. You should use all lines at least once, and some lines may be used more than once.

```
a) test "should have a last name" do
b) two = dentists(:two)
c) assert_not one.valid?
d) one = dentists(:one)
e) assert_not two.valid?
f) end
g) one.last_name = nil
h) two.year_born = Date.today.year
i) test "should be at least 17 or 18 years old" do
j) class DentistTest < ActiveSupport::TestCase
```



13. [9pts] Consider the Dentist *index* page in Figure 3. Using the following lines of code, reverse engineer the view code that produced this page. You should use all lines at least once, and some lines may be used more than once.

- a) <td><%= dentist.first_name %></td>
- b) <th colspan="3"></th>
- c) <td><%= link_to 'Show', dentist %></td>
- d) <th>Major</th>
- e) <tr>
- f) <td><%= dentist.dentist_profile.major %></td>
- g) </thead>
- h) <tbody>
- i) </table>
- j) <%= link_to 'New Dentist', new_dentist_path %>
- k) <td><%= dentist.year_born %></td>
- l) <% @dentists.each do |dentist| %>
- m) <% end %>
- n) <th>Last name</th>
- o) <h1>Dentists</h1>
- p) <td><%= link_to 'Edit', edit_dentist_path(dentist) %></td>
- q) </tbody>
- r) <td><%= link_to 'Destroy', dentist, method: :delete, data: { confirm: 'Are you sure?' } %></td>
- s) <th>Year born</th>
- t) <table>
- u) <td><%= dentist.last_name %></td>
- v) </tr>
- w) <thead>
- x) <th>First name</th>

- | | | | |
|-------------|--------------|--------------|--------------|
| 1) <u>o</u> | 9) <u>b</u> | 17) <u>k</u> | 25) <u>i</u> |
| 2) <u>t</u> | 10) <u>v</u> | 18) <u>f</u> | 26) <u>j</u> |
| 3) <u>w</u> | 11) <u>g</u> | 19) <u>c</u> | |
| 4) <u>e</u> | 12) <u>h</u> | 20) <u>p</u> | |
| 5) <u>x</u> | 13) <u>l</u> | 21) <u>r</u> | |
| 6) <u>n</u> | 14) <u>e</u> | 22) <u>v</u> | |
| 7) <u>s</u> | 15) <u>a</u> | 23) <u>m</u> | |
| 8) <u>d</u> | 16) <u>u</u> | 24) <u>q</u> | |

14. [2pts] Which of the following routes corresponds to the page in Figure 3?

- a) `post '/dentist', to: 'dentists#create'`
- b) `get '/dentists/:id/edit', to: 'dentists#edit', as: 'edit_dentist'`
- c) `patch '/dentists/:id', to: 'dentists#update'`
- d) `get '/dentists', to: 'dentists#index', as: 'dentists'`
- e) `get '/dentists/:id', to: 'dentists#show', as: 'dentist'`

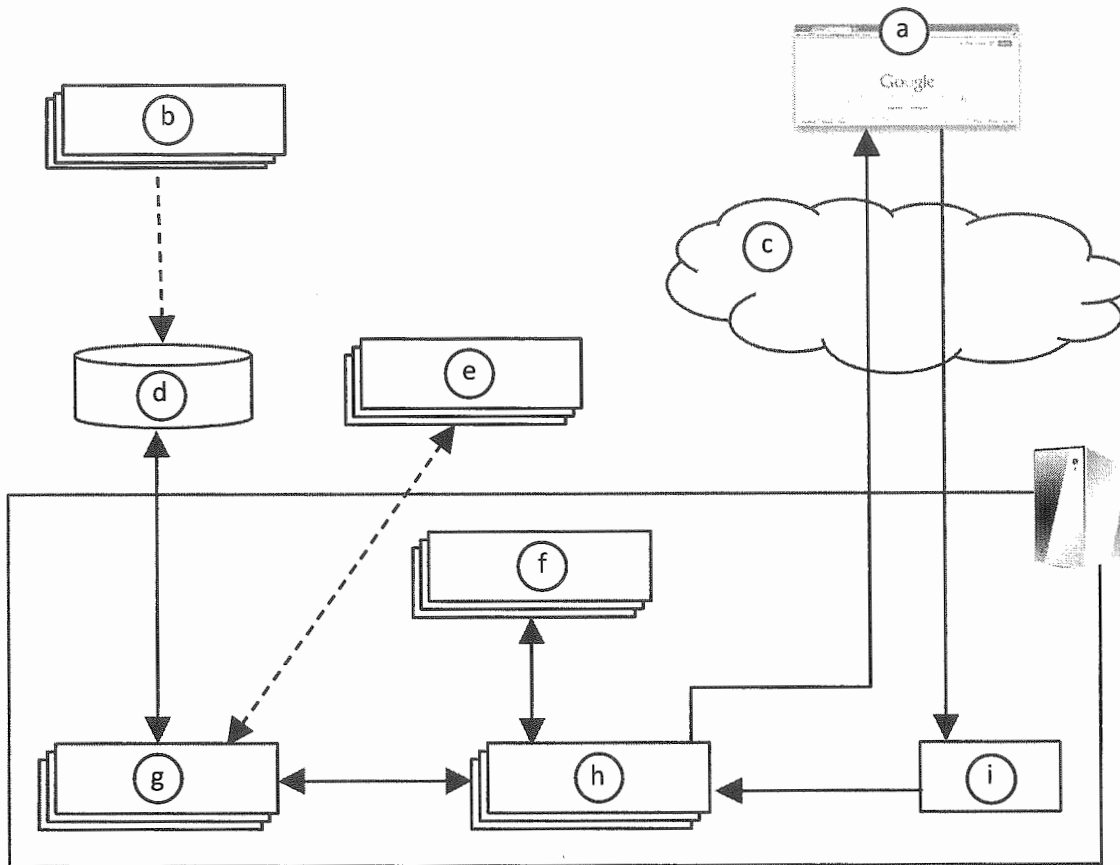
15. [2pts] Which of the following lines of code would the controller need to execute before rendering the view from Figure 3?

- a) `@dentist = Dentist.find(params[:id])`
- b) `@dentist = Dentist.new`
- c) `@dentist = Dentist.new(params.require(:dentist).permit(:first_name, :last_name, :year_born))`
- d) `@dentists = Dentist.all`
- e) None of the above

16. [1pt] True or false? State-affecting controller actions (such as create, update, and destroy) should always render a view, which produces an HTTP response containing HTML for the browser to display.

- a) True
- b) False

Consider this architectural diagram in answering the following questions.



17. [2pts] Which letter in the diagram corresponds to ERB code?

f

18. [2pts] Which letter in the diagram corresponds to a line of code like this?

```
get '/employees/:id', to: employees#show', as: 'employee'
```

i

19. [2pts] Which letter in the diagram corresponds to the code in Figure 1?

g

20. [2pts] Which letter in the diagram corresponds to a line of code like this?

```
assert one.valid?
```

e

21. [2pts] Which letter in the diagram commonly corresponds to the definitions of the methods index, create, and destroy?

h

22. [2pts] What are the M components in MVC responsible for?

- a) Responsible for user interface
- b) Responsible for security of the system
- c) Responsible for “business logic” and domain objects
- d) Responsible for translating between user interface actions/events and operations on the domain objects
- e) None of the above

23. [2pts] What are the V components in MVC responsible for?

- a) Responsible for user interface
- b) Responsible for security of the system
- c) Responsible for “business logic” and domain objects
- d) Responsible for translating between user interface actions/events and operations on the domain objects
- e) None of the above

24. [2pts] What are the C components in MVC responsible for?

- a) Responsible for user interface
- b) Responsible for security of the system
- c) Responsible for “business logic” and domain objects
- d) Responsible for translating between user interface actions/events and operations on the domain objects
- e) None of the above

Figures

```
# == Schema Information
#
# Table name: clinics
#
# id          :integer          not null, primary key
# location    :string
# number_of_doctors :integer
# created_at   :datetime        not null
# updated_at   :datetime        not null
#
class Clinic < ApplicationRecord
  has_many :dentists
end

# == Schema Information
#
# Table name: dentists
#
# id          :integer          not null, primary key
# first_name  :string
# last_name   :string
# year_born   :integer
# created_at  :datetime        not null
# updated_at  :datetime        not null
# clinic_id   :integer
#
class Dentist < ApplicationRecord
  has_one :dentist_profile
  belongs_to :clinic
  validates :last_name, presence: true
  validates :year_born,
            numericality: { less_than_or_equal_to: (Date.today.year - 17) }
end

# == Schema Information
#
# Table name: dentist_profiles
#
# id          :integer          not null, primary key
# birthplace  :string
# major       :string
# graduationyear :integer
# created_at  :datetime        not null
# updated_at  :datetime        not null
# dentist_id  :integer
#
class DentistProfile < ApplicationRecord
  belongs_to :dentist
end
```

Figure 1. Three model classes from the find-a-dentist app.

```
one:
  first_name: John
  last_name: Demento
  year_born: 1973

two:
  first_name: Sterling
  last_name: Bloodgush
  year_born: 1969
```

Figure 2. Test fixture for class Dentist.

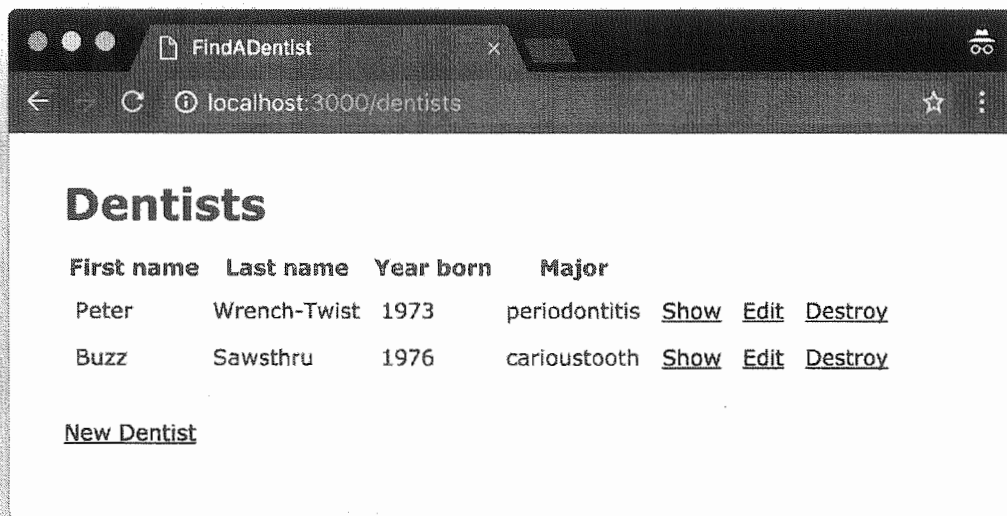


Figure 3. Dentist *index* page.