

1. [1%] Which of the following best describes Git?
 - a. Distributed version control system
 - b. Online version-control repository hosting service
 - c. Virtual machine monitor
 - d. Web development framework
 - e. None of the above

2. [1%] Which of the following best describes GitHub?
 - a. Distributed version control system
 - b. Online version-control repository hosting service
 - c. Virtual machine monitor
 - d. Web development framework
 - e. None of the above

3. [1%] Which of the following knowledge areas is Git most closely associated with?
 - a. Software Design
 - b. Software Construction
 - c. Software Maintenance
 - d. Software Configuration Management
 - e. Software Engineering Process

Each of the following problems presents a Git log graph (log messages omitted) of a local repo and a scenario. Update the graph by crossing out and/or adding appropriate text.

- You may or may not need to use the two blank lines above the graph.
- If you need to add a commit, use the hash c1c1c1c.
- If a command would be rejected by GitHub (e.g., because the remote contains work that you do not have locally), write “REJECTED” on the top line.
- Assume that all remote bookmarks depicted are up to date.

I have included an example problem and solution below to help clarify what’s expected.

Example Problem

Scenario: Developer makes changes to the code, stages the changes, and commits.

```
* 86b8116 (HEAD -> master, iss1)
* dc003f8
* 026c6cf
```

Example Solution

```
* c1c1c1c (HEAD -> master)
* 86b8116 (HEAD -> master, iss1)
* dc003f8
* 026c6cf
```

4. [3%] Scenario: Developer runs `git checkout -b iss2`.

```
* 97c9227 (HEAD -> master)
* ed11409
* 137d7d0
```

5. [3%] Scenario: Developer makes changes to the code, stages the changes, and commits.

```
    * 04ca8c6 (master)
* | 3283dd7 (HEAD -> iss2)
|/
* a8da338
* fe2251a
```

6. [3%] Scenario: Developer runs `git checkout iss4`.

```
    * d197593 (iss4)
* | 0f50aa4 (iss3)
|/
* 75a7005 (HEAD -> master)
* cbff2e7
```

7. [3%] Scenario: Developer runs `git merge iss5`. Assume that auto-merge, if used, would complete successfully with no merge conflicts.

```
* d3994b3 (iss6)
* | 0152ac4 (iss5)
|/
* 77a9025 (HEAD -> master)
* cdf1207
```

8. [1%] Would this be a fast-forward merge?

- a. Yes
- b. No

9. [3%] Scenario: Developer runs `git merge iss7`. Assume that auto-merge, if used, would complete successfully with no merge conflicts.

```
* g4ca8c6 (iss7)
* | 3283dd7 (HEAD -> master)
|/
* a8da338
* fe2251a
```

10. [1%] Would this be a fast-forward merge?

- a. Yes
- b. No

11. [3%] Scenario: Developer runs `git pull origin master`. Assume that auto-merge, if used, would complete successfully with no merge conflicts.

```
* a3b25e7 (origin/master, master)
* e41c5b6
* 9d63832 (HEAD -> iss8, origin/iss8)
* 40f26d8
```

12. [3%] Scenario: Developer runs `git push`. Assume that auto-merge, if used, would complete successfully with no merge conflicts. Assume that all issue branches are tracking with their corresponding branches on the remote.

```
* d3994b3 (HEAD -> iss9)
* | 0152ac4 (origin/master, master)
|/
* 77a9025 (origin/iss9)
```

13. [3%] Scenario: Developer runs `git push origin master`. Assume that auto-merge, if used, would complete successfully with no merge conflicts. Assume that all issue branches are tracking with their corresponding branches on the remote.

```
* e28a3c2 (HEAD -> iss10, origin/iss10)
* f40dd3b
* | 1061bb5 (origin/master, master)
|/
* 86b8116
```

Consider the following list of `git` commands:

- `add`
- `branch`
- `checkout`
- `clone`
- `commit`
- `init`
- `log`
- `merge`
- `pull`
- `push`
- `remote`
- `status`

Ginger has just joined a team of developers collaboratively working on a dog-walk sharing service called *Wufer*. The code for the project is housed in a GitHub repo. All work for the project is being done on issue branches and merged into a `master` branch.

14. [1%] Ginger wants to get a local copy of the code and repo, so she can begin contributing to the project. Which command from the above list should she use?
15. [1%] Ginger wants to create a new issue branch, `iss15`, and switch to the branch. Which command(s) from the above list should she use?
16. [1%] Ginger makes some edits to the source code. Which command from the above list should she use to stage her changes?
17. [1%] Now that she has staged her changes, which command from the above list should she run to save those changes to the local repo?
18. [1%] Having saved to her local repo, she would now like to upload her issue branch to GitHub. Which command from the above list should she run?
19. [1%] While Ginger was working on her changes, other developers on the team merged new changes into the `master` branch. Which command from the above list should she run to merge those changes into her issue branch.

When she runs the command, she gets this message:

```
Auto-merging README.md
CONFLICT (content): Merge conflict in README.md
Automatic merge failed; fix conflicts and then ██████████ the result.
```

20. [1%] Ginger edits the `README` file to resolve the conflict. Which command(s) from the above list should she run next to save these changes to her local and remote issue branches?

25. [8%] Consider the model classes in Figure 1 and the fixtures in Figure 2. Using the lines of code in Figure 3, complete the following model test class such that it has a test for a valid instance of the model class and a test that demonstrates that the model class's attribute validation catches an invalid value. Fill in each blank with the Line ID of the line from the figure that should go there. (The purpose of having you write the Line ID here is to save you the effort of writing the entire lines of code.) You should fill all blanks and use all lines at least once. Some lines may be used more than once. The gaps in each line mark different levels of indentation. You must use these lines/gaps to indent your implementation properly.

```
class LineItemTest < ActiveSupport::TestCase  
  
    _____  
    _____  
    _____  
    _____  
    _____  
    _____  
    _____  
    _____  
    _____  
  
end
```


27. [1%] Which of the following lines of code would the controller need to execute before rendering the form view from Figure 4?

- a. `@order = Order.find(params[:id])`
- b. `@order = Order.new(params.require(:order).permit(:discount_code))`
- c. `@order = Order.new`
- d. `@orders = Order.all`
- e. None of the above

Figures

```
# == Schema Information
#
# Table name: customers
#
# id          :integer          not null, primary key
# first_name  :string
# last_name   :string
# email       :string
# created_at  :datetime         not null
# updated_at  :datetime         not null
#
class Customer < ApplicationRecord
  has_many :orders
end

# == Schema Information
#
# Table name: orders
#
# id          :integer          not null, primary key
# discount_code :string
# created_at  :datetime         not null
# updated_at  :datetime         not null
# customer_id :integer
#
class Order < ApplicationRecord
  belongs_to :customer
  has_many :line_items
  has_many :item_descriptions, through: :line_items
end

# == Schema Information
#
# Table name: line_items
#
# id          :integer          not null, primary key
# quantity    :integer
# created_at  :datetime         not null
# updated_at  :datetime         not null
# order_id    :integer
# item_description_id :integer
#
class LineItem < ApplicationRecord
  belongs_to :order
  belongs_to :item_description
  validates :quantity, numericality: { greater_than: 0 }
end

# == Schema Information
#
# Table name: item_descriptions
#
# id          :integer          not null, primary key
# name        :string
# price       :integer
# created_at  :datetime         not null
# updated_at  :datetime         not null
#
class ItemDescription < ApplicationRecord
  has_many :line_items
  has_many :orders, through: :line_items
end
```

Figure 1. Four model classes from the BurgerShop app.

<pre> one: first_name: Homer last_name: Simpson email: homer@email.com two: first_name: Wilma last_name: Flintstone email: wflinstone@email.com </pre>
<pre> one: discount_code: SPRINGBREAK2019 customer: one two: discount_code: PRESIDENTSDAY2019 customer: two </pre>
<pre> one: quantity: 1 order: one item_description: one two: quantity: 2 order: two item_description: two </pre>
<pre> one: name: Hamburger price: 350 two: name: Soda price: 150 </pre>

Figure 2. Test fixtures for the BurgerShop model classes.

Line ID	Line of Code
assert	assert one.valid?
assert-not	assert_not one.valid?
end	end
one=	one = line_items(:one)
quantity=	one.quantity = -1
test-valid	test "line item should be valid" do
test-quantity	test "quantity must be greater than zero" do

Figure 3. Model unit test lines of code.

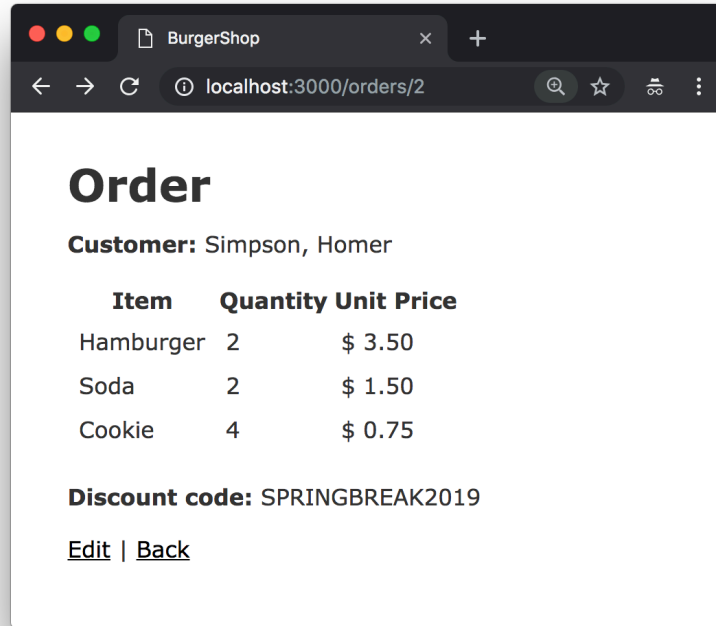


Figure 4. Order *show* page.

Line ID	Line of Code
each	<% @order.line_items.each do line_item %>
end	<% end %>
name	<%= @order.customer.last_name %>, <%= @order.customer.first_name %>
discount	<%= @order.discount_code %>
back	<%= link_to 'Back', orders_path %>
edit	<%= link_to 'Edit', edit_order_path(@order) %>
/p	</p>
/table	</table>
/tbody	</tbody>
/thead	</thead>
/tr	</tr>
h1	<h1>Order</h1>
p	<p>
customer:	Customer:
discount:	Discount code:
table	<table>
tbody	<tbody>
td-sprintf	<td>\${<%= sprintf("%20.2f", line_item.item_description.price/100.0) %></td>
td-item	<td><%= line_item.item_description.name %></td>
td-quantity	<td><%= line_item.quantity %></td>
th-item	<th>Item</th>
th-quantity	<th>Quantity</th>
th-price	<th>Unit Price</th>
thead	<thead>
tr	<tr>

Figure 5. Lines of ERB code for the Order *show* page.