

Notes:

- Please upload answers to a git repository, either local or remote.
- Please use the language given for each question.
- Please attempt every question.

Question 1:**(Language: Python)**

While using a git repository (either local or remote), define the following classes and attributes taking advantage of inheritance:

1. A Vehicle class having a "make" string attribute.
2. A Wheeled class having a "make" string attribute and a "wheels" integer attribute.
3. A Motorised class having a "make" string attribute and a "typeOfEngine" string attribute.
4. An Aircraft class having all the attribute mentioned above, adding a takeOff() method that prints all of them.

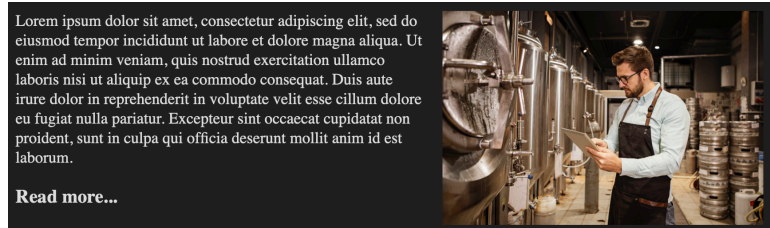
Then, in a separate file:

1. Instantiate a motorised object of make "Ford" and 4 wheels.
2. Instantiate an aircraft object of make "Boeing", 3 wheels and a "kerosene" engine and call the takeOff() method on it.

Question 2: (Language: CSS)

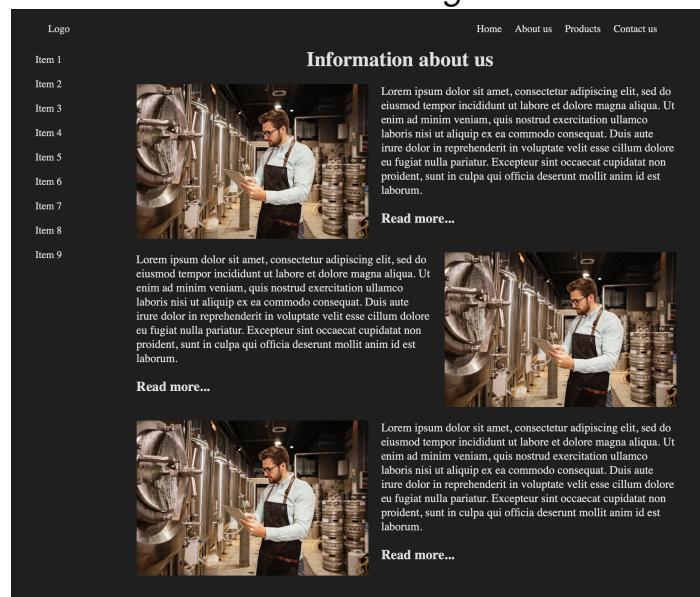
Using the files sent, and without editing the '.html' file, please complete the following tasks:

1. Align the block with id 'top-bar-options' to the right of the navigation bar, leaving the logo on the left.
2. Add a 10-pixel padding to the left and right of the 'nav-item' class when it is a child of the 'top-bar-options' block, and a 10-pixel padding to the top and bottom of the same class when it is a child of the 'side-nav-bar' block.
3. Align the images and text so each image has a block of text next to it (either left or right, depending on the row), as in the image below, the side navigation bar should remain with each item on a single line.



4. Add a 10px padding to both blocks from the above question and make the font size 'large'.
5. Add a hover effect to the text to add a background colour of #4F4F4F. This should not cause any change to the image.

Your final page should look like the below image.



Question 3:**(Language: Javascript)**

Given an object "product" with properties "name", "price", and a method "getDetails". Write a function "updatePrice" that takes this object and a new price as arguments.

The function should create a new object that is a clone of the original, update the price in the new object, with the new price provided, and return the new object.

After calling "updatePrice", both "product.getDetails()" and "newProduct.getDetails()" should still work, but give different values.

Question 4:**(Language: Golang)**

A constant pressure needs to be maintained on G1 by controlling the aperture P1 downstream of a pump, M1, and pressure sensor, G1, as can be seen to the right.

Design a method to constantly adjust the aperture size P1 (as a percentage open) to maintain a constant read on G1.

- It should be assumed the pump power will not change; however, the water supply will fluctuate continuously.
- You should apply a PID controller approach using the feedback from the pressure sensor, G1.
- The speed at which the aperture can open and close is not instantaneous so you should build a delay into the loop to allow effect.
- A PID control loop can often lose stability chasing the desired output, consider this in your design and how you would overcome this instability.

