Onshape Tutorial Project

## Objective: Design a 3D nameplate using Onshape software

### Create an Account

To complete this project, you will need an Onshape account to access the online design software. An invitation to a free Education Account was sent to the email address you provided on the first day of camp.

If you have not yet done so, please open the email that says “***Jovana Bouche invited you to join GenCyber Camp***” and click **CREATE YOUR ONSHAPE ACCOUNT**.

* Choose a password. You will need to remember it to log in again later.
* Enter your first and last name.
* Select **Student** as your **Role**.
* **Company name** is optional. Use may use **Lake Superior College**.
* Check both boxes at the bottom and click **Get Started**.

A new pop-up window will appear.

* Keep all the default settings and click **next**.
* Take a moment to read the default mouse settings to learn how to move the objects that you will create and to change their view.
* Give yourself a nickname. It will be the name that others in the classroom will use to identify you and your projects in Onshape.
* Click **done** to finish the set up.

Congratulations, you now have a free Education Account with Onshape that you can use to design objects for 3D printing. You can access your account from a computer, smartphone or tablet by going to the Onshape website, onshape.com or downloading the Onshape app to your device. Be sure to keep your password safe and accessible during camp.

### Getting Started

Before we can create our first 3D design, we must first create a document to work with. You should still be signed in to your Onshape account to begin.

* Click the **Create** button in the upper left corner, and select **Document…**
* Name your new document **Nameplate** and click **Create**.

You will now see 3 transparent planes (**Top**, **Front**, and **Right**). There is also a cube in the upper right corner showing you the directions of the *x, y, z* coordinates. Take a moment to explore rotating the cube as well as zooming in/out and moving the planes with your mouse buttons and scroll bar.

* Click the arrows around the cube. What happens?
* Right-click and drag your mouse anywhere in the workspace to *rotate* the view.
* Move the scroll bar to *zoom in* and *zoom out*.
* Click the scroll bar and drag the mouse to *reposition* the planes.

### First Drawing

We will create our first drawing on the **Top** plane. This will be the base of our 3D object, the first part to be printed. To make it easier to draw, we need to look at it from the top down.

* Click the **Top** plane to highlight it in yellow.
* Click the **Top** face of the orientation cube in the upper right corner, to create a perfect top-down view of your drawing surface.
* Click the **Sketch** tool to create a new sketch.

The upper toolbar will now display your *drawing tools*.

* Click the **Corner rectangle (g)** tool on the upper toolbar.
* Click and drag your mouse on your workspace to draw your first shape.
* After you release your finger from your mouse, type the number **3** and press **Enter** to change the length of your rectangle to *3 inches*.
* Type the number **1** and press **Enter** to change the width to *1 inch.*
* Edit the name of your sketch by clicking the edit icon (invisible pencil) next to the *green checkmark*.
* Name the sketch **Rectangle Base** and click the *green checkmark* to save.

You have just created your first shape! This file is now listed in the **Features** menu on the left of your screen.

### Creating Dimension

Now we will give our drawing height.

* Click on your new rectangle to highlight it in yellow.
* Click the **Extrude (shift+e)** tool next to the **Sketch** tool.
* On the **Extrude 1** window, change the *Depth* to **0.5 in**.
* Change the name of the Extrude to **Nameplate Height** and click the *green checkmark* to save.
* Right-click and drag your mouse to see what you have created.

### Adding Text

Next, let’s write our name on the nameplate.

* Return to the top-down view, by clicking **Top** on the orientation cube in the upper right corner of your screen.
* Click on your shape to highlight the top face of your nameplate.
* Click **Sketch** to create a new sketch.
* Click the **Text** tool on the upper toolbar.
* Click and drag your mouse within your rectangle to create a text box for your name.
* Type your name over the **Default text** in the text window and click the *green checkmark* to save.

You may need to adjust the size of your text box to fit in your rectangle.

* Click and highlight an edge of your text box, then right-click your mouse.
* From the drop-down menu, select Transform sketch entities.
* Click and drag the middle triangle that appears, to adjust the size of your text box.
* Left click to set the new size.
* Click an edge of your text box and drag your mouse to reposition it as needed.
* Name the sketch **Text** and save it.

### Adjusting the Base to Fit your Text

If your rectangle is too tall and not wide enough, you can open the **Rectangle Base** file to adjust it.

* Double-click the **Rectangle Base** file on the Left, under Features.
* Double-click the *number* that represents the *length* of the rectangle and type a new measurement that better fits the size of your name.
* Do the same for the width.
* Click the *green checkmark* to save.

### 3D Text

Our text will not appear on our printed nameplate, unless we make it three dimensional. Let’s give our letters depth.

* Click to highlight *all* the letters in your textbox.
* Select the **Extrude (shift+e)** tool.
* Change the *Depth* to **0.25in**.

Have your letters extended above your nameplate or have they sunken in? Rotate your view to see what you created.

* Click the direction ***arrow*** above your *Depth* measurement to change the direction of your extrude.

To create the look of engraved letters, you need to create hollow space within the letter outlines.

* Select **Remove** on the second line below the *green checkmark*. Your name should now be indented.
* Name your extrude **Name Depth** and save.

### Fillet Tool for rounded edges

Finally, we will round the edges of our nameplate.

* Click the **Fillet (shift+f)** tool on the upper toolbar.
* Click to select and highlight all the edges you wish to round out. You may need to rotate your view to find them all.
* Try changing the *Radius* measurement to see how it affects the curve on your edges.
* Name your fillet **Edge Curves** and save.

You did it! Your design is now complete!

### Export file as STL

It is time to export your file to your computer, so that you can prepare it for the 3D printer to read.

* In the lower left side menu, right-click on **Part 1** and select **Export…**
* In the pop-up window, change the **File Name** to **Nameplate –** *Your\_name* so that you can easily find your file later.
* Make sure that the **Format** is set as **STL**.
* Make sure that **Options** is set as **Download**.
* Click the **Export** button.
* To find your file, open **File Explorer** and click on your **Downloads** folder.

This was a practice exercise to help you learn how to use **Onshape**. Now you can begin your group project design. We will not be printing these nameplates yet. If you want to print your nameplate ***after*** you have completed the group project, you can save your STL file to your group’s Micro SD card and later convert it to a Slice File using **Bambu Studio**. The Slice File will give the 3D printer the instructions it needs to print your object.