

Hands-on Exercises and Assignments on Google Cloud Platform

Completed Research

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Abstract

It has been challenging for instructors in the MIS/IST discipline to engage students by using a lecture-only teaching technique. This paper presents a set of nifty assignments that consist of the instructor-led hands-on exercises and the take-home individual assignments in an introductory MIS course. Students were instructed to use an online tool to exchange encrypted messages and use Google Cloud Platform (GCP) to deploy virtual machines running PrestaShop, an eCommerce application. The results of a student survey showed that the assignments were fun, relevant, useful, and helpful in improving the students' engagement and learning.

Keywords

Hands-on exercises, encryption, cloud computing, Google Cloud Platform, eCommerce, screencasts.

Introduction

One of the common core courses found in business programs is the Introduction to Management Information Systems (MIS) or Information Systems and Technology (IST). An introductory MIS course typically introduces various information technologies/information systems and their applications in supporting business functional areas such as accounting, finance, and human resources. It would be challenging for instructors in the MIS/IST discipline to engage students by using a lecture-only teaching technique (Burch, et al. 2015). Without touching the information technologies such as databases and cloud computing (Chen, et al. 2012), it is more difficult for students to comprehend the IST concepts.

New knowledge cannot be readily and perfectly assimilated (or encoded) by the learner from direct instruction, either in the form of listening to an instructor's explanation or in the form of reading a textbook. Instead, the acquisition of new knowledge requires learners to be actively involved in the construction of their own knowledge (Chi 2000). Research has shown that learning is facilitated by hands-on activities (Feisel & Rosa 2005; Hoffa 2006). The "Nifty Assignments" known as "Instructor-led Hands-On Exercises" and "Individual Hands-on Assignments" in this paper exposed students to the Google Cloud Platform (GCP) (Google 2018) to deploy virtual machines running PrestaShop, an eCommerce application. Through creating screencasts to demonstrate how to launch a PrestaShop website and manage it on GCP, students reinforced their learning by doing the in-class hands-on exercises and take-home individual assignments.

Designing for Engagement

This paper presents a couple of nifty assignments that consist of the instructor-led hands-on exercises and the take-home individual assignments. The assignments were designed based on a series of class activities aiming to enhance students' engagement and their learning in an Information Systems and Technology course (IST 309), which is a core course for all students in a business school. From our observations, it has been a challenge for instructors in IST discipline to teach IST topics such as encryption and cloud computing without showing students how the real information technologies work. The best way to teach those technologies is to let students use them. Instructors can take the advantage of being scheduled a class in a computer classroom and develop hands-on exercises and assignments to engage students and

help them learn better. Based on the class design model shown in Figure 1, the instructor-led hands-on exercises were developed and used in almost every class session to support different lectures, while the individual hands-on assignments were developed and used outside the classroom to reinforce the lectures and instructor-led hands-on exercises. Some of these developed hands-on exercises required students to use either their own computers or computers in the classroom. In the following section, three nifty assignments are presented to support lectures that cover “encryption” and “cloud computing”.

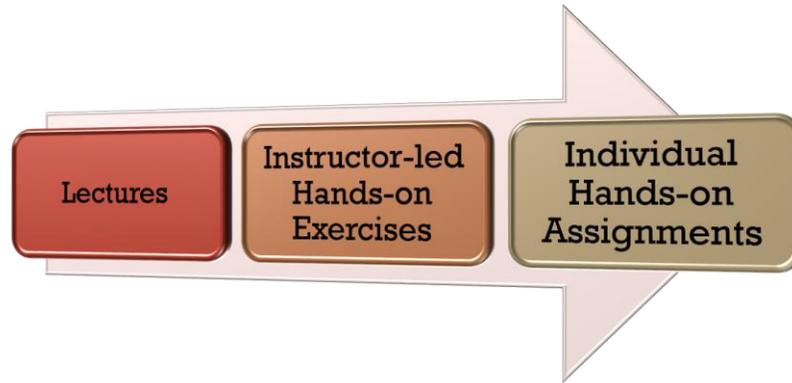


Figure 1. The Class Design Model for Engaging Students

The Assignment

In-class Exercise-Asymmetric Encryption

This in-class exercise was developed to help students learn the concept of encryption, especially the asymmetric encryption, which is widely used in information security area. The exercise was introduced after a lecture on the encryption. The terminologies of encryption such as symmetric encryption, asymmetric encryption, public key, and private key were explained by the instructor. Students were asked to find a partner to work on the exercise. After the instructor’s quick demonstration, students downloaded the instructions, as shown in Table 1 and Table 2, from the Learning Management System (Blackboard), and followed the instructions to complete the exercise. The instructor walked around the classroom to answer questions and help resolve any technical issue. When students completed the exercise, they submitted it to an online journal in Blackboard for the class participation points.

Instructions	Screenshots
<p>Generate the key pair</p> <ul style="list-style-type: none"> Find a partner to work with you Go to https://www.igolder.com/PGP/generate-key/ Generate a pair of keys (Public Key and Private Key) Copy both keys and paste into a Word document (Part I and Part II) Exchange the public key with your partner by email 	

Table 1. The Instructions for generating the key pair

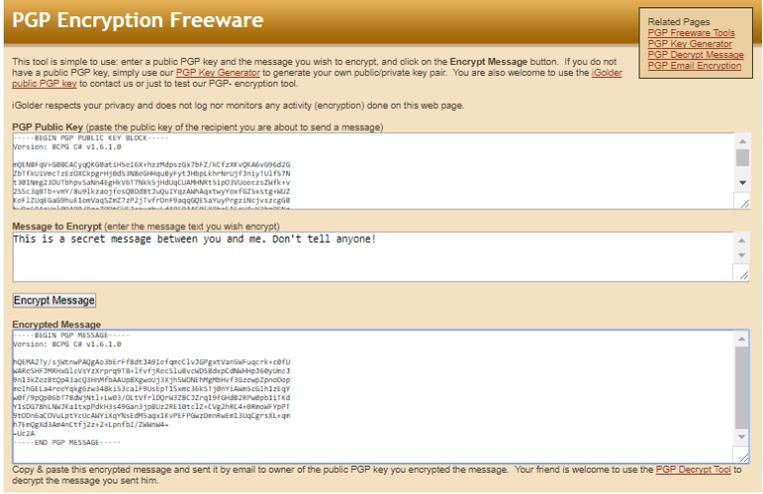
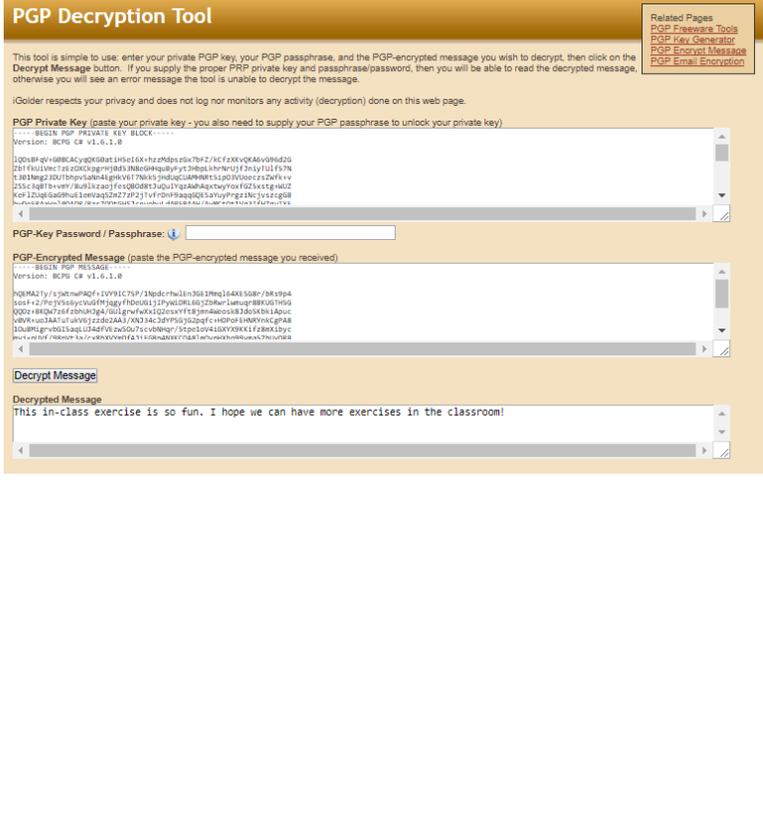
Instructions	Screenshots
<p>Encrypt a message</p> <ul style="list-style-type: none"> Click on PGP Encrypt Message Copy and paste your partner's public key in PGP Public Key area Write one or two sentences to your partner Click on Encrypt Message to generate an encrypted message Copy the encrypted message and send it to your partner again by email 	
<p>Decrypt a message</p> <ul style="list-style-type: none"> Your partner will send you an encrypted message, too (Copy this encrypted message and paste on the Word document as Part III) Click on PGP Decrypt Message Copy and paste your private key in PGP Private Key and input the PGP-key password Copy the PGP encrypted message you received from your partner and paste in the PGP-encrypted message area Click Decrypt Message to get a decrypted message Copy the decrypted message (your partner's message) and paste on Part IV Save the Word document and submit it to IST309 Journal (Individual Journal) in Blackboard system 	

Table 2. The Instructions for Encrypting and Decrypting a Message

In-class Exercise-Google Cloud Platform and PrestaShop

This in-class exercise was developed to help students better understand cloud computing concepts. The exercise was introduced after a lecture on the cloud computing. To engage students and help them learn the advantages and benefits of using cloud computing services, the exercise was designed to use real cloud computing services from a service provider like Google and to show students how easy it is to launch a virtual machine running a powerful eCommerce website, which can be used to support a start-up company or help students themselves to run an online business.

Claim Google Cloud Platform Credit

The first step for students to get started was to claim the Google Cloud Platform (GCP) credit, so students had \$50 balance in their accounts. To help students get GCP credit, the instructor must apply for Google Cloud Platform Education Grant at <https://cloud.google.com/edu/>. Once the application is approved, the coupon code and links (for both the instructor and students) for claiming the GCP credit will be sent to instructor’s email. The instructor then provides the information to students.



Figure 2. The Steps of Claiming Google Cloud Platform Credit

As Figure 2 shown above, students followed the steps to claim the GCP credit. Once the students completed the steps, they stopped at the dashboard of Google Cloud Platform Console and waited for the instructor’s instructions.

Launch a Virtual Machine Running PrestaShop

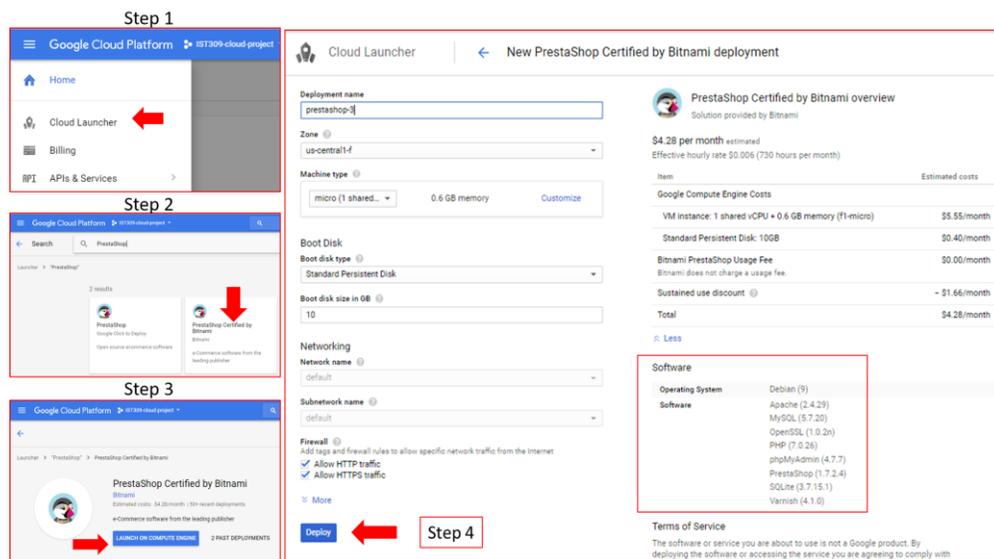


Figure 3. The Deployment of a Virtual Machine Running PrestaShop

As shown in Figure 3, the students followed the instructor's directions step by step to set up and launch a virtual machine running PrestaShop, which is one of the most prolific eCommerce solutions in the world. PrestaShop is free and open source software, with a community of over 1 million active members. During the setup, the students learned how to choose a machine type, memory, and storage for the virtual machine. The instructor explained how quickly a new virtual machine running various software could be launched with only a few clicks.

Explore PrestaShop Features

After the virtual machine was set up, the instructor directed students to check the frontend and the backend of their PrestaShop. The frontend of the site is where a website-visitor can view, while the backend of the site allows an administrator (owner) to access and manage her/his PrestaShop.

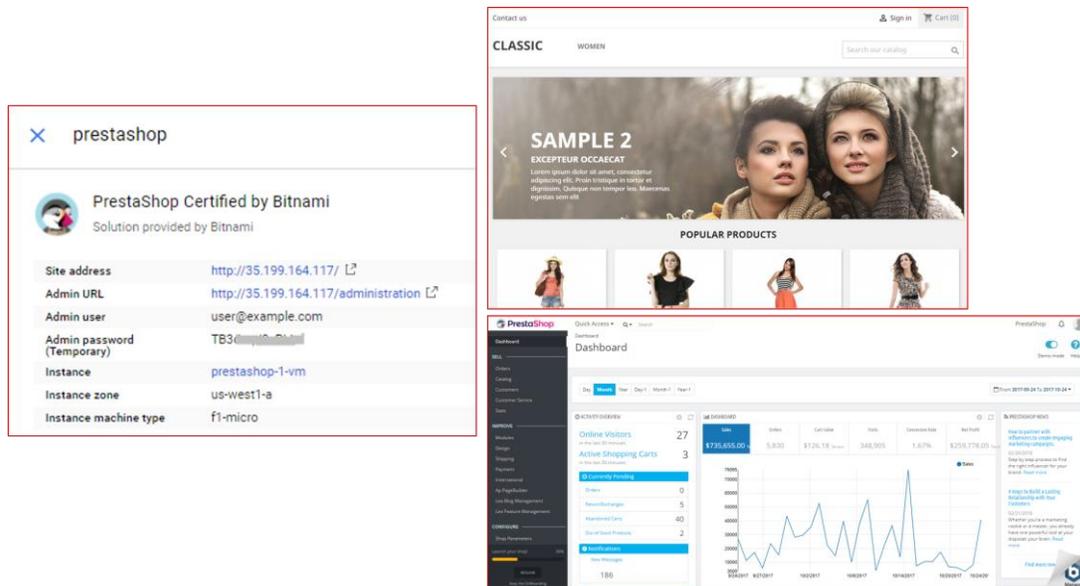


Figure 4. The Frontend and Backend of a PrestaShop Site

The students followed the instructor's directions to perform several tasks on PrestaShop, including placing a new order and adding a new shipping carrier. During the exercise, the students needed to take a few screenshots and submit to Blackboard as in-class participation.

Individual Assignment-Google Cloud Platform and PrestaShop

Assignment Description

In this assignment, the students needed to apply what they learned in the hands-on exercises to demonstrate their skills of launching a virtual machine on Google Cloud Platform to host and manage an eCommerce website, PrestaShop.

Prerequisite

- The students must have claimed their Google Cloud Platform (GCP) coupon code and received \$50 credit for them to use GCP
- The students must have completed the hands-on exercises in the classroom, so they know how to launch a virtual machine to host a PrestaShop website
- If the students miss any prerequisite, they must learn it from their classmate(s) or the instructor

Steps to complete this assignment

The students must assume that they want to create tutorials to teach someone how to use Google Cloud Platform to launch and manage an eCommerce site. Creating screencasts (screen recordings) is a good way to show people how to perform different tasks on a computer. A screencast was coined by Udell (2005), is a screen capture of the actions on a user's computer screen with or without real-time audio narration (Chen & Rabb 2009). Screencasts are usually produced and outputted in various video formats and can be post-processed to enhance video quality such as trimming unnecessary parts and adding transition effects. Screencasts can be easily produced by a single person on a computer with screen recording software and an audio recording device, if available.

The first step to complete this assignment is to learn how to use screen recording software. The recommended screen recorder for the assignment can be found at www.screencast-o-matic.com (SOM). The students can also use any other screen recorders. The links to the tutorials of SOM are listed in Appendix A. The second step is to complete the following four tasks.

- Task 1: Students use SOM to record how they launch a new virtual machine to host a PrestaShop site on GCP
- Task 2: Students use SOM to record how they change a new theme for their e-shop
- Task 3: Student use SOM to record how they add a new product category and add three products in the new product category for their e-shop
- Task 4: Student use SOM to record how they add a new discount rule (cart rule) for their e-shop, so their customers will get discounts when the customers' orders meet certain criteria

Discussion of Impacts/Benefits

Student Feedback

Quantitative data from the most recent quarter was collected and data analysis is just beginning. In a learning experience survey, the students were asked questions regarding how the in-class exercises helped them engage in the classroom and learn the topics better. The preliminary results showed very positive feedback. As shown in Figure 5, among forty-three survey respondents, most of them (76.7%) gave the answer "5: Very Helpful" on how helpful the exercises engaged students. There were also 79.1% of respondents gave the answer "5: Very Helpful" on learning new topics. If we include the respondents who gave the answer on either "5: Very Helpful" or "4: Helpful", the previous percentages would increase to 95.3% and 97.7% respectively. The students showed their strong interests in doing those in-class exercises and take-home assignments and thought the exercises and assignments were helpful to engage them in the classroom and help them learn the IST concepts better.

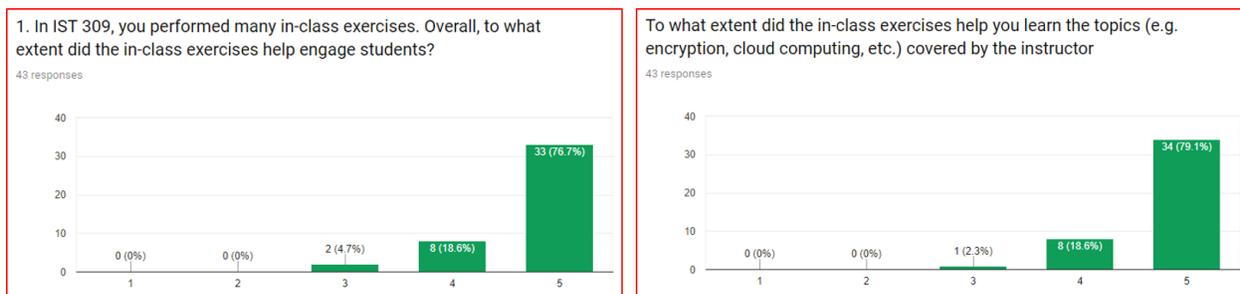


Figure 5. The Survey Results regarding Students' Engagement and Learning

The open-ended question aimed at the students' learning experiences with the assignments also showed the encouraging results. Here are some of the qualitative data collected from the same learning experience survey.

- *"This was my favorite assignment because I gain valuable knowledge that I can possibly start an online business. In addition, recording a how to create a PrestaShop via virtual machine help*

reinforce my understanding of this idea. I got to learn the details/ behind the scenes of both back & front end of my PrestaShop.”

- *“Super Fun and eager to use the application.”*
- *“It was really fun! I had never created anything like it”*
- *“It was very helpful in learning how to use both a virtual machine and how to make screencasts; which were both things I didn’t know about before this class.”*
- *“I am glad to get to know more approaches to create my own website and show people how I get it done via screencasts.”*
- *“It was a great experience it showed me how to create my own online store.”*
- *“I think it is very helpful for our future career ! ”*
- *“Making a screencast was extremely helpful in helping me better understand the topic. I always find it effective by teaching the material to someone so that it also helps me to better understand the material. Teaching to learn is the best way.”*
- *“It was a fun exercise, we don’t normally get that kind of hands-on experience in business courses.”*
- *“It was a lot of fun learning how to create a virtual machine and also doing a screencast. I had never done either of those things in the past but it was very helpful to know.”*

Conclusion

Instructors in the MIS/IST discipline are facing challenges to engage students in IST courses where the students learn topics related to various information technologies. Without touching the information technologies such as databases and cloud computing services, it is more difficult for students to comprehend the IST concepts. One of the best ways to teach students about the IST concepts/applications is to let them touch and use the information technologies. This paper presents a set of nifty assignments that were fun, relevant, useful, and helpful in improving the students’ engagement and learning. Further implementation and research will help the instructors to improve their teaching effectiveness and deliver high-quality education to students.

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<http://www.oreillynet.com/pub/a/oreilly/digitalmedia/2005/11/16/what-is-screencasting.html?page=1>).

Appendix A-Individual Assignment

Assignment Description

In this assignment, you need to apply what you learned in the in-class exercises to demonstrate your skills of launching a virtual machine on Google Cloud Platform to host and manage an eCommerce website, PrestaShop.

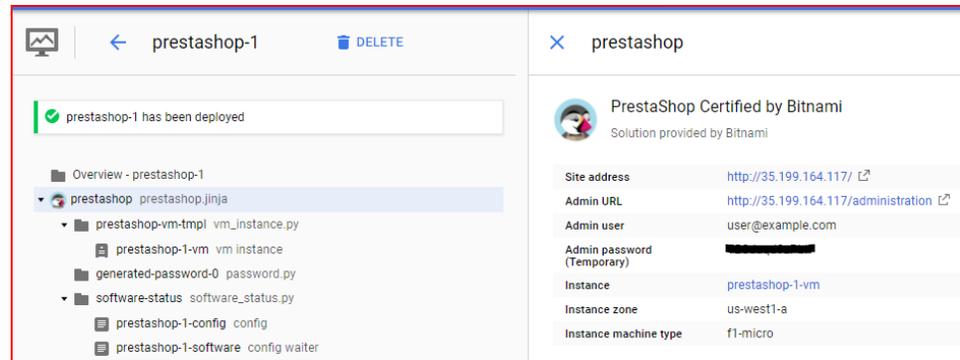
Prerequisite

- Claimed your Google Cloud Platform (GCP) coupon code and received \$50 credit for you to use GCP
- Completed in-class exercises, so you know how to launch a virtual machine to host a PrestaShop (eCommerce software) website
- If you missed any prerequisite, you must learn from your classmate(s)

Steps to complete this assignment

Let's assume that you want to create tutorials to teach someone how to use Google Cloud Platform to launch and manage an eCommerce site. Creating screencasts (screen recordings) is a good way to show people how to perform different tasks on a computer. Follow the following steps to complete this assignment.

- **Step 1: Learn how to use a screen recorder**
 - Recommended screen recorder: www.screencast-o-matic.com (SOM) or you can use any other screen recorders
 - Tutorials on official Screen-O-Matic website
 - <http://help.screencast-o-matic.com/channels/cD6qqL3yt#navback>
 - <http://help.screencast-o-matic.com/channels/cD6qq83yu#details-co6hFtf9Pe>
- **Step 2: Complete the following tasks**
 - **Task 1: Use SOM to record how you launch a new virtual machine to host a PrestaShop (eCommerce) site on GCP (25 points)**
 - At the beginning of the recording, introduce yourself and the topic of your video
 - Sign in to GCP console
 - Use cloud launcher to find **PrestaShop Certified by Bitnami**
 - Launch a virtual machine (micro, 1 shared vCPU with 0.6 GB memory) in “us-west-1” zone with 10 GB SSD Persistent Boot Disk
 - You can **pause** the screen recording when your virtual machine is being set up
 - When your virtual machine is up and running, resume your screen recording to show the **front-end** and **back-end** (where you can manage your e-shop) of PrestaShop
 - The front-end is a customer's view of your e-shop. e.g., click on the IP address like <http://35.199.164.117/> (your IP address is different) to link to your website
 - The back-end is the user-interface that you can manage your e-shop website. You need the username and password to access it. e.g., <http://35.199.164.117/administration> (find the link and click on it in Deployment Manager or you can copy and paste the URL into a web browser



- Name your video (screencast) properly
 - Upload your video to YouTube in “**unlisted**” mode

- **Task 2: Use SOM to record how you change a new theme for your e-shop (25 points)**
 - Launch the SOM recorder and start recording the following steps
 - At the beginning of the recording, introduce yourself and the topic of your video
 - During the recording, you can pause at any time (e.g., when you are waiting for downloading a file) to keep the video short
 - Use Google to search “PrestaShop free theme” such as free themes from Apollotheme.com (you may need to sign up an account)
 - Download a free theme that supports PrestaShop version 1.7+ to your computer
 - Go to PrestaShop back-end and click on “Design” and then on “Theme & Logo
 - Click on “Add new theme”
 - Locate the theme file you downloaded (it is usually a zip file) and save it
 - Check if the new theme listed in Theme & Logo
 - Mouse over to the theme and click on “use this theme”
 - Go the front-end (refresh it) and check if the theme has been changed to the new one
 - Finish recording, name the video and upload it to YouTube

- **Task 3: Use SOM to record how you add a new product category and add three products in the new product category for your e-shop (25 points)**
 - Launch the SOM recorder and start recording the following steps
 - At the beginning of the recording, introduce yourself and the topic of your video
 - During the recording, you can pause at any time (e.g., when you are waiting for downloading a file) to keep the video short
 - Go to PrestaShop back-end and click on “Catalog” and then on “Categories”
 - Click on “Add new category”
 - Input category name and description and click on “Save”
 - Check if the new category is listed in Categories
 - In the same back-end, click on “Catalog” and then on “Products”
 - Click on “NEW PRODUCT”
 - Add “image”, “category”, “product description”, “pricing”, “shipping” and “quantities” for each product
 - You can pause recording when you are adding the second and the third product
 - Go the Products list and show you have successfully added three new products
 - Finish recording, name the video and upload it to YouTube

- **Task 4: Use SOM to record how you add a new discount rule (cart rule) for your e-shop, so your customers will get discounts when their orders meet certain criteria (25 points)**
 - Launch the SOM recorder and start recording the following steps
 - At the beginning of the recording, introduce yourself and the topic of your video
 - During the recording, you can pause at any time (e.g., when you are waiting for downloading a file) to keep the video short
 - Go to PrestaShop back-end and click on “Catalog” and then on “Discounts”
 - In Carts Rules tab, click on “Add new cart rule”
 - Input “information”, “conditions” and “actions” for the rule, and then click on “Save”
 - Click on “Catalog Price Rules” tab. Click “add new catalog price rule”
 - Input “information” you need to apply the rule and click on “Save”
 - Check if those rules are successfully created.
 - Finish recording, name the video and upload it to YouTube
- **Step 3: Submission**
 - Copy the following information from the Deployment Manager in GCP and YouTube and paste them into a Word document
 - The site address of your PrestaShop website
 - The admin URL of your PrestaShop website
 - The URLs of YouTube videos that you created for each task
 - Do not use screenshots here, so I can click on those links to grade your work
 - Due date: mm/dd/yyyy at 11:59 PM
 - Save the Word document and submit it to Blackboard

Tips for creating screencasts

- Make sure you know how to perform each task on GCP and PrestaShop
- Organize your ideas of how to present your tutorials
- Rehearse your presentation (Practice makes perfect!)
- Keep your screencasts short and sweet (see the guideline in the high-quality screencasts section).
- Set your YouTube video(s) as “**Unlisted**”, so other students cannot find your video(s) on YouTube and copy your work