Creating Learning Objects

For the NSF Project: "Scaling Elements of a Competency-based/ Hybrid Instructional Model in Adv. Mfg. Courses"

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What are Learning Objects:

1. Learning Objects are housed in the course within the LMS

2. Common objects are the textbook and PDFs

3. Videos and voice over PPT are the most effective objects

4. Interactive simulations will be covered next session

5. Study guides and quizzes/tests are also learning object

6. A very effective object is formative assessments with feedback

7. Example 1 of formative assessment with feedback

Learning Objects that Navigate the User

Some learning objects will navigate the user through the learning object. This object paces the student through a lesson and may include some formative assessment questions along the way.

This example is a learning object on hand tools from Wisc-online.

These objects are typically created either of these two software packages:
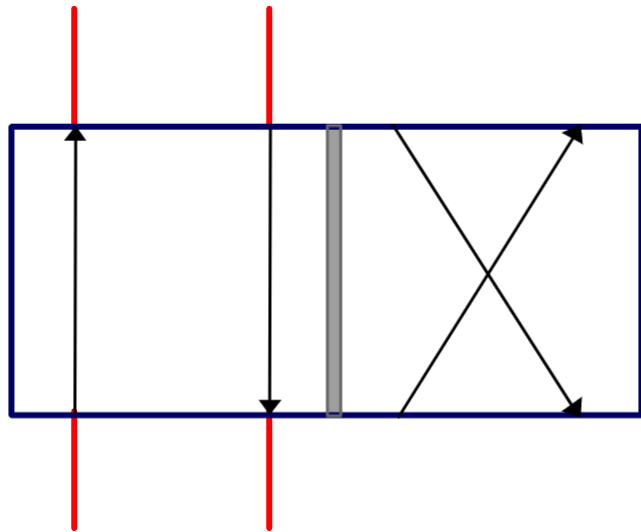Articulate Storyline
Adobe Captivate

This software is typically used by an instructional designer. Seldom do faculty use this software.

Navigating in Wisc-Online:

These red lines represent four conductors, which are pipes or holes through which hydraulic fluid flows.

It is called a 4-way, 2-position directional control valve.

In the Wisc-Online learning object, the user must navigate to the next screen by clicking the Next button in the lower right of the screen.

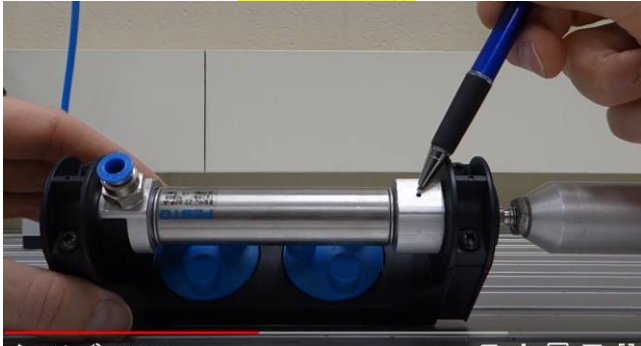The user can also repeat a slide by clicking the Back button.
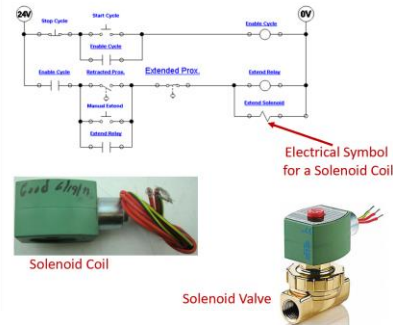
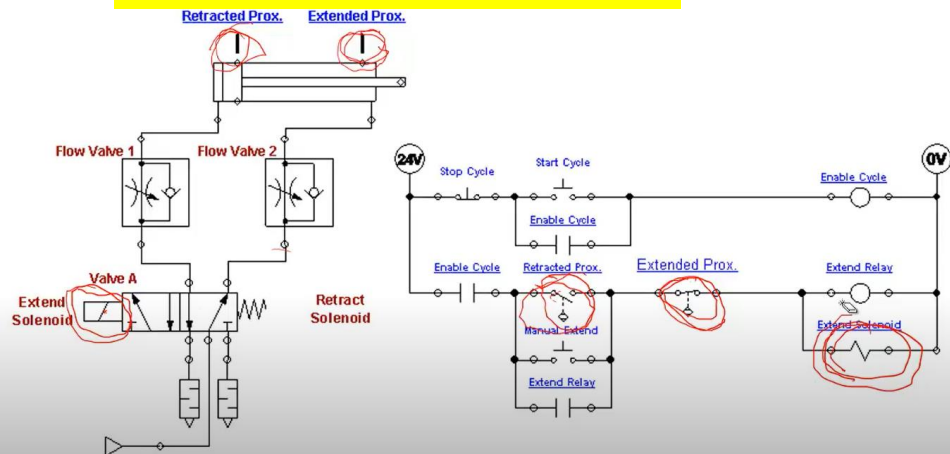# Learning Objects the User Navigates

Videos

PPT/PDFs

Voice over PPT Video

Independent Learning Objects are posted in an LMS for student access. These objects can be viewed in any sequence. The upper left graphic shows a video that was shot with a camera, explaining a single acting pneumatic cylinder.

The middle graphic is a PPT that will be converted to a PDF, then posted in the LMS.

The bottom graphic is a voice over PPT, where the graphic was put into PPT, then annotated with a stylus on the computer touch screen.

All of these objects can be viewed on a smart phone, phablet, tablet or computer screen.

Cameras for Creating Videos:

One of the common tools that our Industrial Technology Instructors use is a simple Panasonic Point and Shoot camera. It is small with a zooming lens, with a removeable SD card, and a very sensitive internal microphone. The inverting tripod allows us to position the camera upside down to shoot onto an object or whiteboard (laying on a desktop). One of the most powerful features is the Panasonic Image app that runs on the smartphone. The camera has its own WiFi portal, thus the phone connects to it, then the image app controls the camera zooming, taking photos and taking videos. The SD card is removed then put into a port on the computer where it is then transferred to the HD, and produced with the Camtasia Producer software.
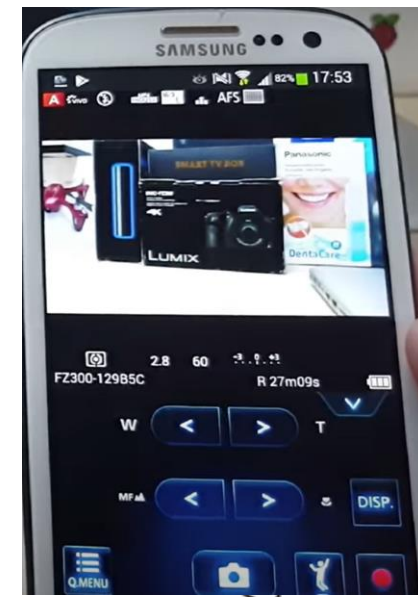
Panasonic Lumix Point & Shoot   Inverting Tri-Pod   Panasonic Image Smart Phone App

Cameras for Creating Videos:

I also use a high end camera when I need to use different lenses, use different lighting filters and want higher quality images and videos. This is primarily if I am doing something for a vendor who needs a little higher quality than for instruction. I can get UHD 4K video quality. Usually $700+. It also has a removeable SD.

Olympus E-M10 Mark III

SD Cards for Recording Videos and Images:

The SD cards will be used in most cameras to store the videos and pictures that are taken with the camera. I seldom use an SD less than 128GB in size, because they will fill up quickly. Remove the SD from the camera and connect it to the computer, to load the videos and images, so you can use the software tools to develop the learning objects

SD to USB Interface

SD Cards: GigaBytes

GoPro Cameras:

GoPro Recording of Video:

Software used to Create Objects

TechSmith (Techsmith.com), located in Michigan, developed and distributes Snagit and Camtasia. These products are targeted toward Faculty. They are simple to use and give immediate results. Snagit is an image or video capture software, and Camtasia is a product with multiple uses, but in the end it produces high quality videos. MP4 is the preferred video format for creating instructional videos. MS PowerPoint is the other key software that is needed to create illustrated graphics and animations. Google Slides does not have all of the features that MS PowerPoint has.

Snagit 2019

Camtasia 2019 Recorder

Microsoft PPT
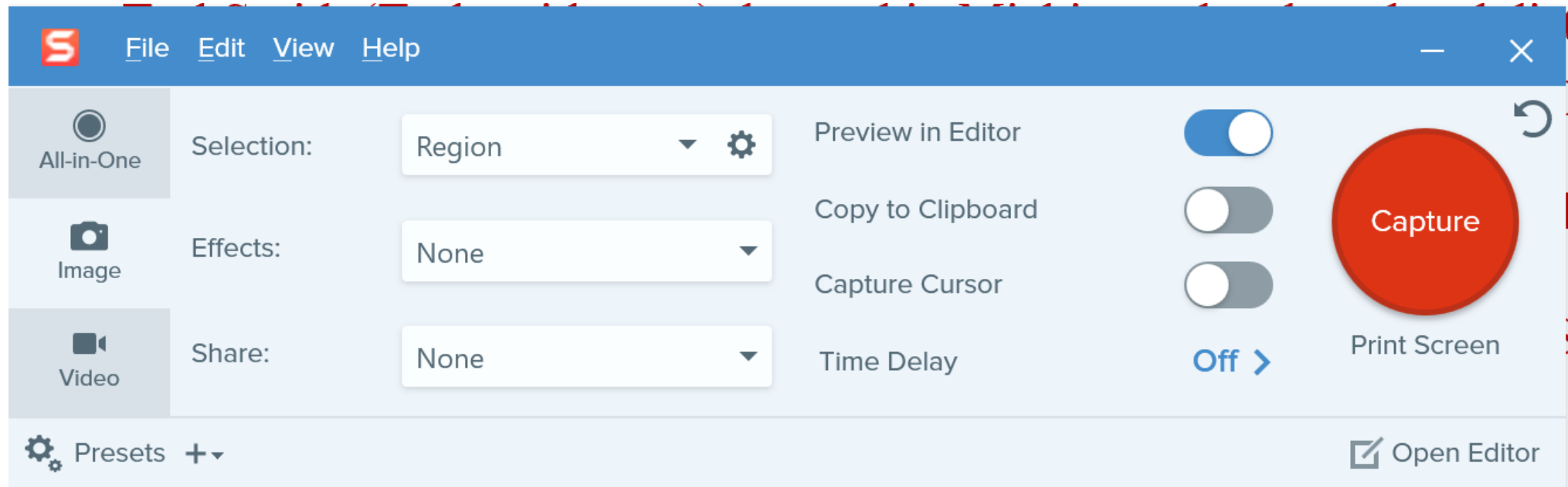
Snagit 2019 Editor

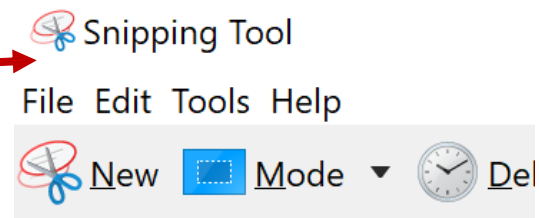Camtasia 2019

TechSmith
Show What You Know

TechSmith Snagit 2019 (Capture):

This is the interface for Snagit capture. The user can designate a hot key such as the "PrtSc" key (Print Screen), which will bring up the cross hairs for capture.

Windows 10 Snipping Tools

TechSmith Snagit 2019 Editor:

Tools to modify the image

Shows recently captured images

TechSmith Snagit Editor Library

User can go to any Month & Day for images

Proximity Sensors/Switches:

A

Commercial proximity
sensor/switches

Retracted Prox.

B

Normally-open
(NO)

prox

Proximity Switch in an
electrical circuit

Proximity sensor mounted
on a cylinder, sensing a
magnet on the piston

Position Sensor

C

NITRA

Retracted Prox. **Extended Prox.**

D

Proximity Sensor in a
pneumatic circuit
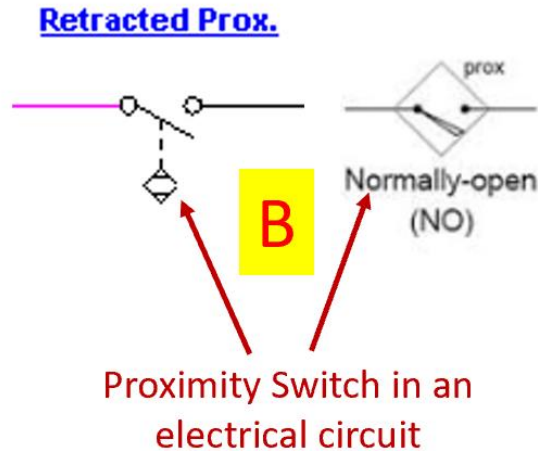
Proximity switches are devices that sense a part without touching it. A limit switch will touch a part, but a proximity switch senses it. The confusing part of this is that there is one symbol for a pneumatic circuit, and a different symbol for an electrical circuit. The reality is that these are the same device. In graphic A, two proximity switches are shown. They have the sensor on the head (blue part) and the switch internally.

Graphic B shows the two different electrical symbols for proximity switches.

Graphic C shows a magnetic sensor that senses a magnet that is built into the piston of the cylinder. When the cylinder is fully extended, the proximity switch will actuate. Graphic D shows something very similar with a graphic from Automation Studio. Notice that there are two symbols for the proximity sensor on the pneumatic print.

There are two types of proximity sensor: inductive and capacitive. An inductive senses metal, and a capacitive senses non-metals.

Electrical circuit operation:

When the two diamonds line up, the Extend Prox. switch changes state

If a contact shows a purple block between the two contacts, the contact is passing power

When the two diamonds above line up, the Extend Prox. switch will open, dropping out the Extend Relay and Solenoid
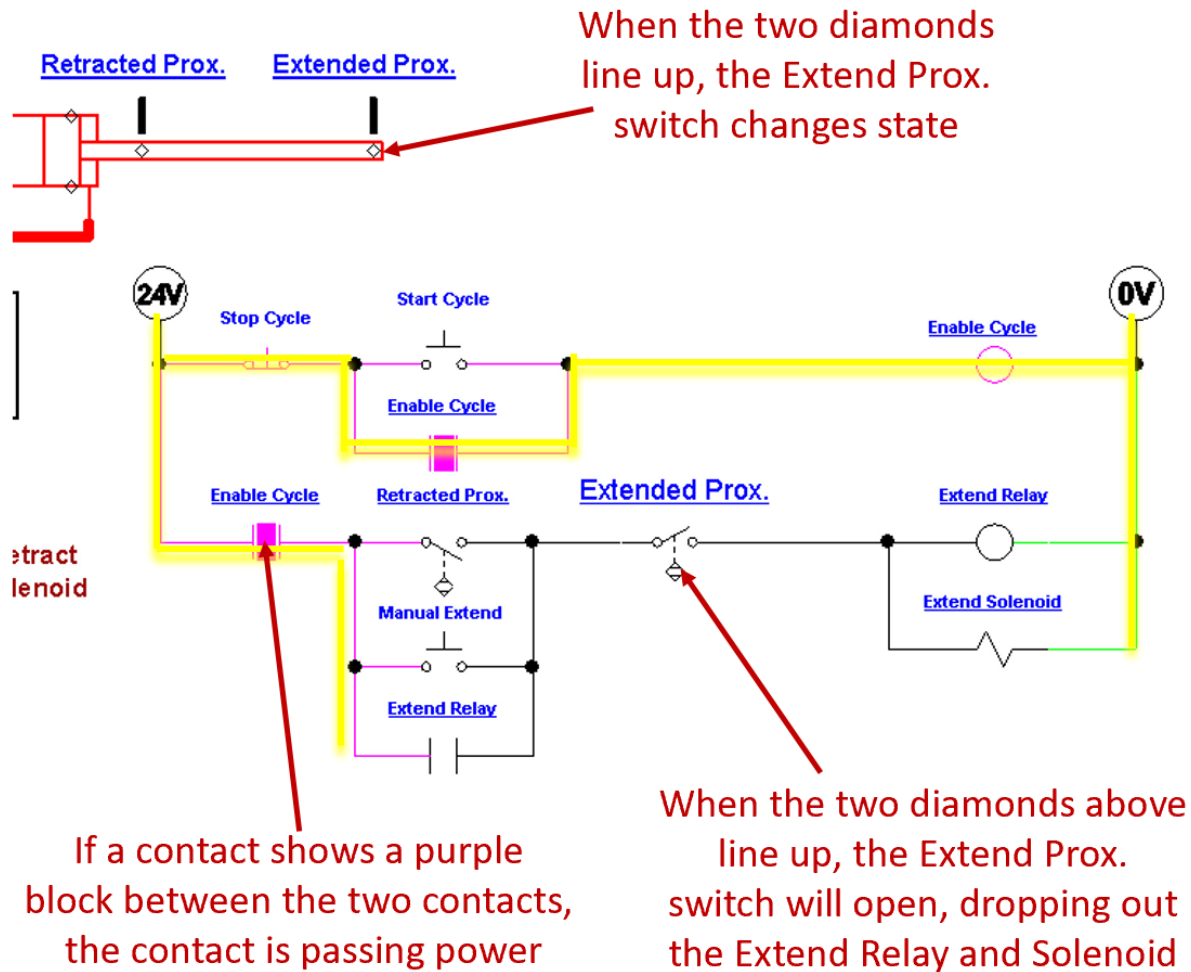
This graphic will give a further in depth explanation of the electrical circuit.

This slide shows that the cylinder rod is fully extended, which actuated the Extend Prox switch. This will open the switch in the last rung of the electrical circuit, which will in turn drop out the Extend Relay and Extend Solenoid coils. This will cause the 5/2 valve to shift back to the default position (due to the spring return), which will start retracting the cylinder.

Forward Power Flow
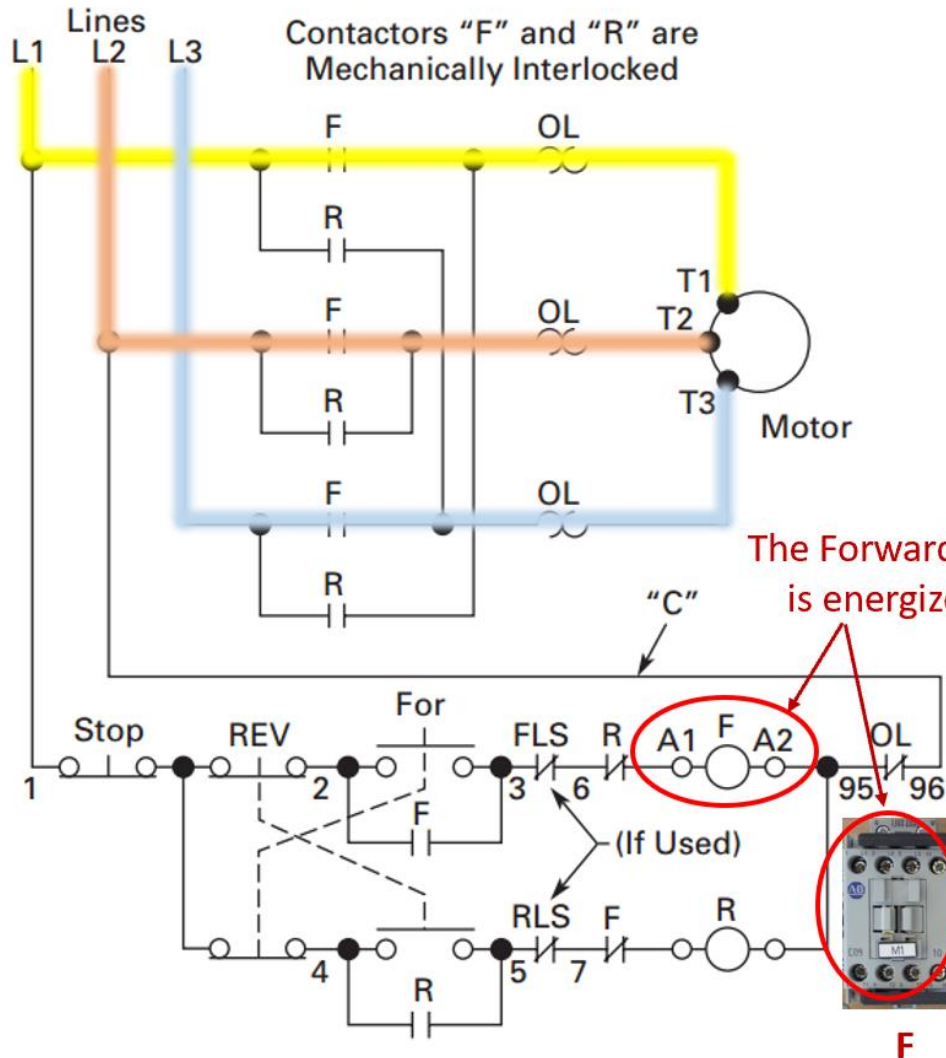
In this illustration, assume that the "F" (Forward) contactor coil is pulled in, which will close the power contacts of the Forward contactor. This will connect L1 to T1, L2 to T2, and L3 to T3; through the three "F" power contacts.

Let us assume that this is the forward direction. In a later slide, we will look at an installation will use a mechanical, and two electrical interlocks to make sure that the "F" coil and the "R" coil are not energized at the same time.

The Forward coil is energized

An IEC Reversing Motor Starter

TechSmith Camtasia Recorder

This software is used to capture the screen of the computer, as well as the voice of the faculty that is creating the video. This can be used to create a video on how to use software that a student will have to learn to use. Camtasia recorder can also be used to do a voice over PowerPoint video, using a stylus on the computer screen, or on a Wacom Tablet to annotate on the screen.

F9 Starts the Recording, and can be used to pause the recording

F10 is used to stop the recording, then it automatically starts Camtasia 2019 (Producer) with the recording
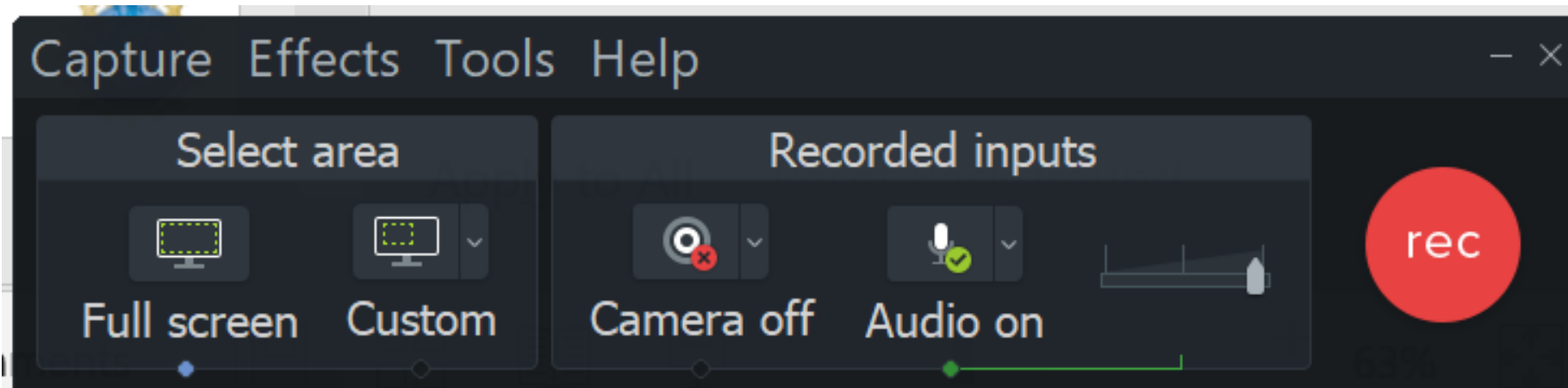
TechSmith Camtasia Producer

Camtasia (Producer) is used to add effects to an MP4 video, edit (or splice) videos, and most of all, to compress the video into a smaller file that can be uploaded to YouTube, or loaded into an LMS for students to download. A smaller file in the LMS minimizes delays for the student, and smaller files take less time for YouTube videos.

Three types of Video Learning Objects:

Created with a camera:
(Example: How to do something in the lab)

Computer Screen CAM:
(Example: How to use CAD or PLC Software)

Voice Over PowerPoint:
(Example: Explaining the symbols on a schematic)

Camtasia 2019 Recorder

Camtasia 2019 Recorder

Camtasia Producer 2019

Camtasia Producer 2019

Camtasia Producer 2019

Explaining 5/2 Valves.MP4

Moving RSLinx in Virtual Backplane.MP4

Explanation of Lab 6.2 circuit.MP4

Load the MP4 into the LMS for students to download and view:

OR

Upload the MP4 to YouTube, then insert Link into the LMS for students to view:

**Camtasia Producer compresses the MP4 to a smaller file size, making uploading and downloading more efficient.

Informational Learning Objects (PDFs)

Informational PDF, which are sometimes termed Targeted Learning Objects are usually created in either Word or PPT. The examples I have are with PPT. These will many times have a graphic, then an explanation.

Here are a few examples of Informational Learning Objects:

IND134 Module 5 Intro to Electrical circuits 050318

IND223 Module 2 Motor Branch Circuits ver B

IND220 Module 7 VFDs Basics

Instructional Videos:

Camtasia will be used to create instructional videos. If Camtasia Recorder is started, I can start a video of my screen and add voice and even annotation to the video. The videos are then produced in Camtasia 2019, then saved as an MP4 file. Camtasia condenses the video. The video is then loaded onto a YouTube channel, then the YouTube link is put into the LMS.

IND134 Lab 4.1 Auto Return circuit in lab with print overlays 3

IND220 Explanation of Lab 2.3 Circuit 1 082420

IND220 Explanation of Lab 3.3 Circuit 1 091620

Annotating on the Screen in Camtasia

WACOM is a company that makes a digitizing tablet that connects to the computer via USB or Bluetooth. The tablet allows the user to draw on the screen of a computer that is not a touchscreen. Many touchscreen computers come with a stylus for drawing on the screen, instead of using a Wacom Tablet.

Purchase & register your Intuos Pro
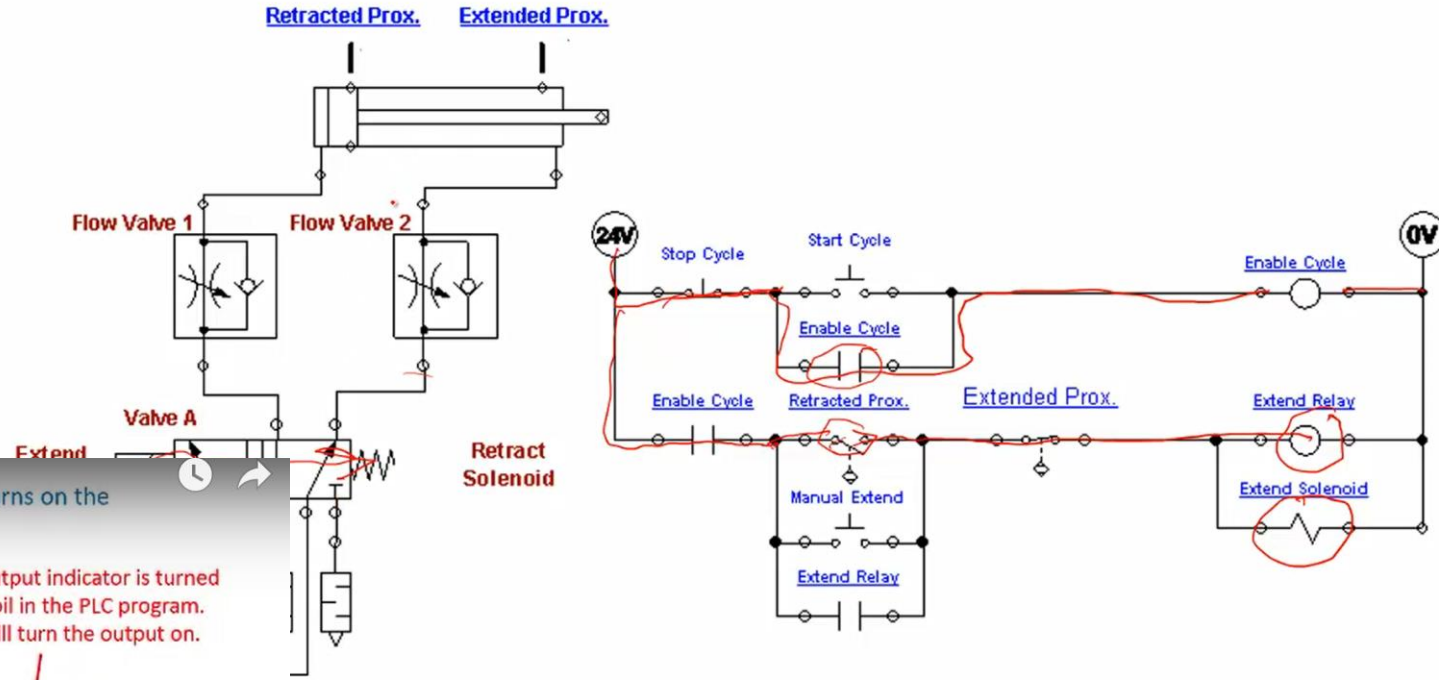to receive creative software

Software offer available in Americas only

Annotating on the Screen in Camtasia Recorder

The WACOM tablet, or stylus on a touchscreen will allow the Faculty to draw on a picture, similar to drawing on a whiteboard.
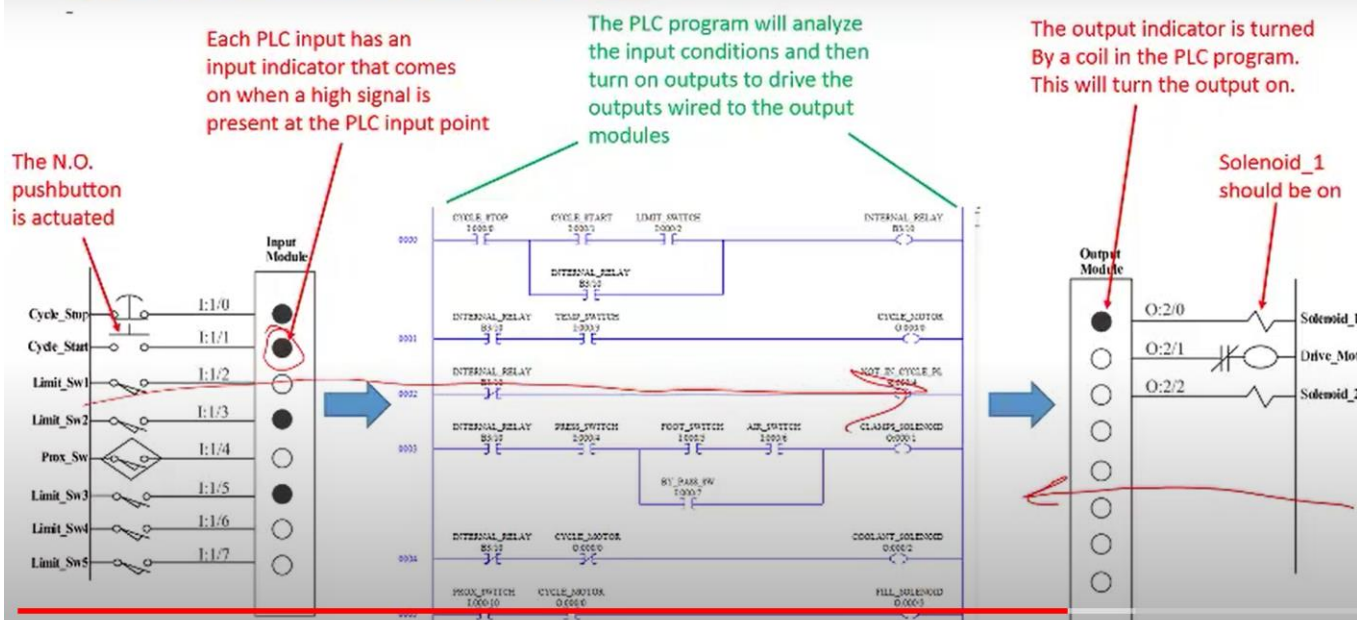
Video Links in the LMS:

Video Links (or MP4 videos) are loaded into your LMS so students can view the videos from the computer or portable devices. Where do these links originate?

1. Faculty finds a video on YouTube for students to view

2. Faculty finds a video on Skillscommons.org or Vimeo

3. Faculty creates their own video, then loads it into YouTube, or loads the MP4 into the LMS

Storing Videos on YouTube:

If you create your own videos, you may decide to upload them to YouTube, and use the link in the LMS for students to view.

1. Your IT department should create a YouTube channel for you

2. Always have a way of documenting your video uploads

3. A Gmail account can give you a YouTube channel

4. Updating captions are important for ADA compliancy

Linking to YouTube Videos:

YouTube is a great source for finding videos for the students to view, but also as a place for the faculty to store their videos. A link from the video within the LMS, will allow the students to stream the video to their computer or portable devices. Each video on YouTube has a unique Video Identifier.

YouTube Video: T. Wylie, Video on setting RSLinx and FTLinx on virtual backplane, 12/4/20
https://youtu.be/POSmMFjfajg

Video Identifier

YouTube Video URL that will have the video start at a specific time:

https://www.youtube.com/watch?v=1K0YF1foxVk&t=3m10s

YouTube Video URL that will have the video start at a specific time, and end at a specific time:

https://www.youtube.com/embed/SMsYHbtYnK8?start=50&end=60

Demonstration on Creating Objects:

1. Capturing with Snagit

2. An Informational PDF

3. Recording a video with Camtasia Recorder

3. Voice over PowerPoint Video

4. Editing a video with Camtasia

5. Adding a video to another video

6. Uploading to YouTube

How-To Videos for Session 2:

YouTube Video: T. Wylie, Video on Finding OER Videos and Simulations 042221
https://youtu.be/uo934NaFoxs

YouTube Video: T. Wylie, Video Searching for OER in Skillscommons 042221
https://youtu.be/ep4Erjg46bs

YouTube Video: T. Wylie, How to produce an MP4 with camtasia producer 042421
https://youtu.be/2iZCLMnSDhk

YouTube Video: T. Wylie, 21_0425_Example of a voice over PPT video
https://youtu.be/KXi-iqFUohU

YouTube Video: T. Wylie, 21_0425_Creating a video and uploading to Youtube
https://youtu.be/ZG4jEiF2Wgw

YouTube Video: T. Wylie, 21_0425_Edit closed captions in Youtube
https://youtu.be/eNdX1RrBf5U

The End of the Presentation

Please email the presenter with Any questions you may have, as well as any feedback on the session (twylie@northweststate.edu)