

Project Guidelines

Name: _____ Group #: _____

MATH 361

Fall 2011

I will not limit your choice of topic to consider in many ways, but all topics chosen should adhere to the following guidelines:

- Topics must deal with ordinary differential equations subject matter, above and beyond what we consider during the course. This does not mean your topic has to be more difficult than what we discuss in class, but it should not repeat something done in class without a meaningful extension. If you are in doubt about your topic choice, feel free to ask.
- Topics must be appropriately narrow and capable of demonstration of some quantitative component within Maple. Expository topics are specifically excluded.
- Topics may not be chosen which deal with partial differential equations or calculus only. Subject matter must remain within this course.

If you are unsure of what direction you want to go, a great resource would include part of our textbook we will not cover during the semester, as well as any of the websites listed below.

Student Projects in DE: online.redwoods.cc.ca.us/instruct/darnold/deproj/index.htm

Case Studies in Differential Equations: www.ibiblio.org/links/webhtml/DEindex.html

Internet Differential Equations Activities: www.idea.wsu.edu/projects.php

In addition to these resources, I have a few books containing interesting starting points for project ideas that I am willing to loan out or copy pages from.

1 LaTeX Poster Requirements

Posters are common occurrences at undergraduate conferences in technical fields like mathematics and the sciences. A successful poster carefully crafts the research question, explains the steps carried out in performing the research, and clearly explains the research outcome. To develop a good sense for creating poster presentations you should find examples of poster sessions given here on campus in your departments as well as from other universities via the web.

I have provided several examples of Beamer Posters for your comparison. See the relevant blog post for more details.

2 Screen Cast Requirements

The goal of the screencasting projects is to introduce you to the tools in Maple which you are expected to integrate in the analysis of your final project. The screencasting mini-projects are listed below, with due

dates. The entire project is to be completed in Maple and recorded via Camtasia or some other screen recording software in the digital media center, located in the library. Upon completion the projects will be posted on the course blog for other groups to comment on. Only one screencast per group is needed. Please be sure all group members' names are on the Maple file.

The following are the only limitations being placed upon your creation of the screencasts:

- The majority of screen capture should occur within Maple, though presentation slides in power point, keynote, and/or LaTeX Beamer can, and should be included to help guide the presentation.
- Screen casts should be between 15 and 20 minutes in length.
- Screen casts should be recorded and produced in at least 800 x 600 resolution.
- Your screencast should include audio narration of both the steps you are taking as well as qualitative information interpreting your results in the context of the problem.
- Your screencast must contain an introductory title slide which includes your group members' names.

Aside from these restrictions you are free to experiment with any and all features of screen casting available to you to create your screen cast. Managing time wisely will be key to completing this projects. Work as a team, and this will be easier.

3 The Screen cast Creation Process

3.1 Content, Script, and Storyboard

Begin your screencast with an understanding of your audience. What do they already know about the topic? What are you trying to teach them? Decide what you should cover, what you dont have to say, and how specific you need to be. Keep in mind some basic best practices of educational multimedia - people learn better when information is presented:

- in small chunks
- using clear outlines and headings
- using a conversational style rather than a formal one

Even though you are making a movie of your computer screen, remember that you're still telling a story. Avoid detailing step by step methods or PowerPoint bullets in a methodical manner. This can be very boring to an audience.

As you think through your topic, it can be useful to create storyboards - rough sketches of what you will present and in what order. Storyboarding helps you organize the source material and ensures that you cover what you need to cover. A storyboarding template is included with this project brief. You do not have to turn in your storyboards or template if you choose to use such aids.

Some people find that writing a script, or at least a bullet point outline, helps them focus the video and organize what they'll need. If you're able to narrate your screencast in a clear and concise way based only on bullet points, then you may not need to write out exactly what you plan to say. Others find that having a word-for-word script keeps them on track. It also makes synchronizing the video with the narration much easier down the road.

3.2 Shooting Your Screencast

At this point, you are ready to start filming. I generally use a two-step process. First, with my script in hand, I capture only the video sections while practicing my narration. Next, I record the voice narration while carefully syncing it with the video. It takes a little practice, but I made fewer mistakes when I wasn't trying to capture and narrate at the same time. For more informal screencasts just hit the record button and do both the video and audio simultaneously, narrating off bullet points. Note, however, that editing is more difficult if you record both video and audio at once. If you find that the applications you are recording are taking a lot of time to load, be sure not to narrate over those sections so you can easily cut out the wait time in the editing process.

While it's possible to capture your entire screen, you shouldn't. Even with the best compression, extra screen real estate translates to wasted space and costly file size. You may not need the title bar, toolbars, status bar or scroll bars in your browser, for example. **In general, anything that doesn't help to tell the story should be cut.** I generally capture a window at 800x600 with the same playback size or 640x480 depending on my file size and time limitations (larger files take longer to render).

Screencasts are literal copies of your screen activity, so make sure you are capturing the action on screen. You may also need to use zoom or pan functions to maintain focus or so menu details do not get lost. Take care to only move your mouse around when you're doing it to make a point.

3.3 The Digital Media Center

The new Digital Media Center, located downstairs from the Learning Commons, is open to students and faculty. The DMC offers recording and editing facilities to support most educational media projects with no experience required. The DMC operates on an open lab model that makes the facilities available whenever the library is open. Groups can set up an appointment time call or email the DMC at

Appointment phone: 325-455-0457
Email: dmc@acu.edu

For further information concerning the Digital Media Center, and for a list of getting started tutorials check out the Digital Media Center blog at <http://blogs.acu.edu/digitalmediacenter>. Take advantage of this resource.

3.4 Editing

Your editing process will differ depending on your choice of tools. Since I use Camtasia, a software package that allows me to both capture and edit, I tend to do a rough edit for content and flow as I shoot the movie. In this way, I have a draft complete when I'm finished "shooting". If you are using separate screen capture and editing programs, you'll need to edit your screen capture segments, pull them into the video editing package, and then add narration, titles, zooms, and other effects.

Next, I watch my screencast and notes on places that require a close up, captions, titles, transitions, or where the audio isn't quite synchronized with the video. I also listen carefully for places in the audio where the voice over is less than polished (for instance uhs and hmms), and do what I can to clean it up. This part of the editing process can be tedious, but polishing your work can improve the production values greatly. If you're a perfectionist, try not to get obsessed at this stage, as it can be very time consuming. I'm learning to let certain things go.

3.5 Final Production

If you want to post your screencast to the web, you'll need to compress it to translate the video format to one that takes up less file space. This is a complex but important topic. A more advanced software tool can help you through this topic for instance Camtasia has several production wizards that walk you through the trade-offs of video and audio quality versus file size and format. It asks you a series of questions about your source material, file size requirements, and video/audio quality to help you pick the right file format and screen size. In other words, you don't need to be an expert in compression formulas.

When you are ready to output your video to a compressed and final format called producing or rendering - keep in mind that longer screencasts can take awhile to render. Some of my screencasts have taken an hour to render, preventing me from doing other work on my computer.

If you are new to using multi-media tools like video and audio software, you'll need to expect a learning curve when you start screencasting, but it isn't an insurmountable task to master the software and techniques. Start by creating a screencast about something you're frequently asked or to document a piece of internal knowledge. Don't be afraid to think of screencasting as if it were a home video - it's easy enough to capture your screen that you can just do it, and use it if it's useful. If you're creating something to use

internally, it may not need to look great.

It can be a bit more difficult to create good production values—solid audio, framing, pacing, and more. If your audience and the context requires better production values, you'll need to spend more time planning the content, honing your skills, and refining the screencast. You'll need to work in a different mode—to channel a Hollywood filmmaker and create something that not only shows a process but tells a story.

For many, refining their multi-media skills will be worth the effort. If you do, the next time that someone asks you that same question for the nineteenth time, or you're struggling to communicate a complex idea, you can let a screencast do the talking for you.

3.6 Tips for Screencasting in Maple

Maple can be a bit tricky to screencast from because of the technical nature of a Maple document. Some tips for getting ready to do Maple screencasts included:

- Prepare the Maple document ahead of time and suppress all output. This will allow you to simply evaluate expressions you have already prepared rather than type in code as you are trying to narrate the production. Keep in mind you should explain what your code is doing, why you picked the particular expression you did, and how it relates to the problem at hand.
- Include a description of the problem within the Maple document. Preferably at the beginning of the document that you can point your audience to.
- To make the screencast more interactive, identify one or two parts of your Maple document as areas where you can interact with the code you have prepared, by adding an animation or changing the color of plots, etc... This makes your presentation more dynamic and showcases the use of Maple in helping your audience to better understand something very technical.