CS190 Project Requirements

LinuxDJ

1. Title: LinuxDJ
2. Description:
   A DJ program for Linux. Currently no decent ones exist. This would be loosely modelled on VirtualDJ, which is a PC product with a Mac beta. It would support audio filters, surround sound balance control, mixing/blending of audio tracks, stretching or compressing songs to match beats (automated), looping based on number of beats, and possibly more, all real-time.
3. Features:
   (a) Better UI than existing software.
   (b) Support for mixing/blending/warping 1 or more tracks, not just 1 or 2.
   (c) Support for fading between songs, or fading between sets of songs.
   (d) Apply audio filters and effects to each input song individually.
   (e) Warp speed of songs to have the same or different beats, or just speed and slow songs.
   (f) Automatically adjust speed of a new song to match currently playing song, if the user chooses.
   (g) Support looping of sections of songs, based on time *or* number of beats.
   (h) Support multiple song file formats.
   (i) Apply all effects in real-time.
4. Priorities (in decreasing order):
   (a) Real-time audio processing - if effects cannot be applied in real-time, the software becomes audio editing software, not live DJ software, and loses significant usefulness.
   (b) Support for fading between songs - this is the most commonly used feature of DJ software, and in some cases is the bare minimum for calling software a piece of DJ software.
   (c) Looping support - for live remixing, this is an absolute must.
   (d) Independent effects controls for each song being mixed - a must.
   (e) Support for altering song speeds and matching beats automatically - also listed as a must for smooth transitions and interesting remixes.
   (f) Better UI than existing software - most amateur DJ software on all platforms has a terrible interface. VirtualDJ on Windows is probably the best out there, but is still cluttered with largely-unused features. There should be auto-hiding of unused UI elements.
   (g) Supporting many file formats for input.

(h) Audio effects filters - a nice touch, though not strictly necessary.

(i) Support for more than 2 songs - lower priority, because it's nice, but the final upper limit depends on the software's efficiency, and the hardware used.

5. Usage:
   Adam White, amateur DJ, enjoys remixing various techno songs live when his friends have parties. He needs something easy to use, functional, and preferably light on resources.

6. Requirements:
   Must support the first 5 elements in the priorities list, without which it provides no compelling reason for use other than running on Linux. Real-time effects in particular is absolutely imperative, as it is not functional DJ software without it.

7. Divisibility:
   There are many pieces: UI, audio output interface, various effects (audio processing), relative effects (e.g. matching beats), file format support.

8. Potential Difficulties:
   Anything real-time is inherently hard, because it imposes very strict response time requirements, which are extremely harsh. Audio processing also would require some research, and may be difficult to implement. Basically all of the requirements other than the UI are of significant difficulty, and doing any of them wrong makes the software unuseable.