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Editing

CHAPTER 11

Reduced to its most basic definition, editing is the process of combining video and audio elements from various sources into a coherent whole. For example, you may have one videotape that has footage of the mayor waving to a crowd and then walking into his office and another that has an interview with the mayor in which he talks about his bid for reelection. Through editing, you can combine these video and audio sources, discarding material you don't need.

Using a switcher in a studio production situation, as discussed in Chapter 9, can be thought of as a form of *real-time* editing. Here, too, you are selecting various sources of video (cameras, satellite feeds, graphics, etc.) at appropriate times to create a coherent production. **Postproduction** editing, however, is usually a more deliberative process in which much more time is taken in selecting and combining various sources of video. As its name implies, postproduction editing takes place *after* the video material has been gathered. A postproduction editor may take many hours to create a finished product that is only a few minutes in length.

Two basic editing processes can be used in postproduction editing. **Linear editing** uses videotape both as the source of the footage to be used and as the recording medium. In essence, linear editing is recording from one videotape onto another. In **nonlinear editing**, all of the video footage is stored in digital form on a random access medium (such as a hard drive), then edited using a computer.

Nonlinear editing offers the **random access** to stored information described in Chapter 10, and it also overcomes many of the temporal limitations of linear editing, as you will see. Nonlinear systems such as the one shown in Figure 11.1 have been rapidly replacing tape-based systems.

However, many tape-based editing systems are still in use and likely will be for some time. For that reason, this chapter discusses linear editing as well.

The *disciplines* of editing include thorough planning before the editing even begins and attention to aesthetic considerations. The *techniques* of editing, while differing according to the equipment being used, still involve general practices that are addressed in this chapter as it covers the following:

- Types of editing situations, including the difference between on-line and off-line editing (11.1)
- The importance of planning and making decisions about editing *before* entering the editing suite (11.2)
- The basic process of nonlinear editing, including capturing, editing, and outputting (11.3)
- The difference between assemble and insert editing (11.4)
- The basic processes of linear editing (11.4)
- The importance of understanding editing aesthetics, including continuity and ethical considerations (11.5)

11.1 Editing Basics

As discussed, editing differs from studio production switching in that it is largely a postproduction process. There are, however, several different types of situations in which editing is used, each calling for a specific technique.

Editing Situations

Editing can be used in conjunction with studio-based production. The daytime “soaps” and some prime-time situation comedies are shot using a multiple-camera technique. Such a program is recorded while the director calls the shots as if it were a live production, and the output is recorded to tape or a **video server**. At the same time, each camera is *slaved* to its own recorder, which records everything that camera shoots during the production. Then, if a problem occurs during the production that involves a poor shot or a switching mistake, it can be corrected by editing in shots from one of the slaved cameras. For example, if the director calls for camera 1 but the **technical director** accidentally takes camera 2, the correct shot

from camera 1 can be edited in afterward. If one of the performers flubs a line, it might be possible to edit in the correct line from a dress rehearsal (if it was taped), or additional **pickup shots** might be recorded at the



Figure 11.1

Computer-based nonlinear editing systems like this Avid are rapidly replacing linear tape-based systems. © 2004 Avid Technology, Inc. All rights reserved. Avid is a registered trademark of Avid Technology, Inc. Image is provided courtesy of Avid Technology, Inc.

end of the production. Correcting and improving shots and sound from the “live” studio-based production in this way is called **sweetening**.

Editing is also used in single-camera production situations such as dramas, commercials, rock videos, and documentaries. In these projects, camera footage usually includes multiple takes of individual segments, often shot out of sequence and at different locations. The editing process, then, essentially starts from scratch, assembling the program from these diverse video elements. This type of editing—on a much less sophisticated scale—is also used in news-gathering situations, as a videojournalist shoots the various parts of a news story (such as interviews, reporter stand-ups, and footage), then edits them together into a coherent story called a **package**. These packages, which are edited onto tape or a video server, are then used as part of the live production of the nightly newscast.

The newscast itself is produced in a manner similar to studio-based productions described in this section’s first paragraph, and the recorded packages are played during the show as **roll-ins** (see Chapter 12). For example, the news anchor will say, “Joe Smith has the story about the mayor’s visit to France,” and then the package of the mayor’s visit will be played. Shows like *Entertainment Tonight* and *60 Minutes* use the same technique.

Off-line and On-line Editing

The terms **off-line** editing and **on-line** editing used to have definite and discrete meanings. However, due in large part to the advent of low-cost, high-quality videotape recording formats and—later—computer-based nonlinear editing systems, their definitions are now somewhat blurred. To make clear what the terms *originally* meant and what they have actually come to mean, it is necessary to look at a bit of history.

In the early days of electronic videotape editing, it was common practice to make copies of the tapes containing raw footage and other material to be edited. These copies would then be used to edit a **rough cut**, a basic representation of what the finished program was supposed to look like. This was called off-line editing. Then, once the rough cut was exactly the way it was supposed to be, the original tapes would

be used to create an edited **master** that would look (and sound) just like the rough cut, but at a higher quality. This was called on-line editing. The point were that the original tapes would not be subject to the wear (and possible damage) caused by a lot of editing “experimentation” and other work leading up to the finished product.

In most cases, off-line and on-line editing were done on separate equipment as well. A production house, for example, might have a dedicated off-line editing suite for rough cutting and a dedicated on-line editing suite for creating edited masters. The equipment in the off-line suite would normally be of a lower quality than the equipment in the on-line suite.

Today, the most commonly used definitions of off-line and on-line are based on these same concepts. If the *purpose* of the editing is to create a rough cut and not a finished product, it is generally called off-line editing. If the purpose is to create a finished product, it is generally called on-line editing. What has changed is that often the on-line and off-line editing are both done on the same equipment. For example, with nonlinear editing equipment, the editor might first create a rough cut using video that has been **captured**, or recorded onto the computer, at a lower quality (see Section 11.3), and later create the edited master using the same equipment but recapturing the video at higher quality. Or, if the finished product doesn’t *need* to be of the highest technical quality (for example, a video to be shown only over the Internet), both the off-line and on-line work might be done using equipment that would only be good enough for off-line broadcast work.

On occasion, you will hear people make distinctions between on-line and off-line work that are not based on the purpose of the editing. Some people, for example, use “off-line” to refer to any equipment that is lower quality than “on-line.” Others might refer to the *quality* of the finished product, saying that work produced for the Internet is “off-line” and work produced for broadcast-quality is “on-line.” For our discussions, however, we use the purpose of the editing as the criteria for distinguishing the two terms: If the purpose is to create a rough cut, that’s off-line editing; if the purpose is to create a finished product, that’s on-line editing.

Title Class Project 1								
TC: Non-Drop Frame								
001	Footage1	V A1	C		01:05:15:00	01:05:25:00	00:00:10:00	00:00:20:00
002	Interview1	V A1	C		05:10:10:28	05:10:42:28	00:00:20:15	00:00:52:15
002	Interview1	V A1	D	015	05:10:10:13	05:10:10:28	00:00:20:00	00:00:20:15
003	Footage1	V A1	C		01:10:10:15	01:10:20:20	00:00:52:15	00:01:02:20

Figure 11.2

A sample portion of a printed edit decision list. At the top, you see the title of the project, and the time code mode (in this case, non-drop frame). From left to right, the columns are: (1) the event number, (2) the tape that the footage comes from; (3) the edit mode (all of the edits shown are video and audio channel 1); (4) the transition type (C = cut, D = dissolve); (5) the length of the transition (shown only in event 2); (6) the begin time on the playback deck; (7) the end time on the playback deck; (8) the begin time on the record deck; and (9) the end time on the record deck.

Edit Decision Lists

The transition from off-line to on-line mode is greatly facilitated by the creation of an **edit decision list (EDL)**. As shown in Figure 11.2, the EDL keeps a record of each edit, including what tape the shot originally came from, where the shot is on the tape, and how long the edited shot is. It also shows transitions and which video and audio channels were edited. Once created in off-line mode, the EDL can be fed into the on-line system, allowing the editor to automate the production of the completed product.

Although they originated with tape-based linear editing, EDLs are also used in nonlinear editing. In these cases, the EDL won't necessarily keep track of which tape the shot was on, but of the shot's location on a video server or other storage device. EDLs can be created and used by both computer-based edit controllers (see Section 11.4) and nonlinear editing programs. In fact, you might do the off-line editing using a linear editing system, then transfer the EDL to a high-end nonlinear system to do the on-line work. An EDL may also be used to reedit a **standard-definition** program in **high definition**. For EDLs to work properly, however, all of the different tapes, servers, and other systems must identify footage using **time code**, which was discussed in Chapter 10.

Compression

The use of **compression** to make video signals less resource-intensive was discussed at length in Chap-

ter 10. However, at this point it is necessary to address some additional compression factors that bear directly on editing.

You will remember that the two main types of compression are **intraframe compression**, in which each **frame** of video is treated as a discrete unit, and **interframe compression**, in which frames are analyzed in groups, discarding information that doesn't change from frame to frame (such as the plain white background behind a person). Some compression systems, such as M-JPEG and DV, use only intraframe compression, while others, such as MPEG-1 and MPEG-2, use both intraframe *and* interframe compression.

Interframe compression systems can make the video signal more compact because most of the video frames they send are not complete. Consider a group of 30 frames of video of a person standing in front of a white wall. For the first frame of this video, the compression system will create the entire frame, containing all of the information in the original signal. These frames are called *intracoded*, or "I," frames. However, the next several frames are not likely to be complete; instead they will contain only the portions of the frame that changed from the I frame (such as the person's moving lips and eyes). These frames are called *predicted*, or "P," frames, and they are created by essentially predicting what the picture will contain based on previous frames. There are also *bidirectional*, or "B," frames, which are predicted by looking at both previous and succeeding frames. In a group of 10 frames, then, there may be only two or so complete I frames,

containing all of the information needed to create the frame.

If you think about this for a moment, you will be able to see how it could cause problems for editing. Since we get a complete frame only once every, say, 5 or 10 frames, we cannot perform frame-accurate editing. Instead of making an edit at time code 01:05:06:11, for example, we might have to make it at 01:05:06:18 because that's where the nearest I frame is. In some cases, that might not be a big problem, but if we require pinpoint editing at a precise frame, it could be.

That is why formats that do not use interframe compression, such as DV, are often preferred for editing. However, some MPEG-2 systems can actually create extra I frames on command if necessary. In other words, if the editor wanted to edit at precisely 01:05:06:11 and there was no I frame there, the system could create one. Also, MPEG profiles can be adapted so that more I frames are available to facilitate editing, but this of course comes at the price of a lower **compression ratio**. Interframe compression does not make precise-frame editing impossible by any means, but you need to be aware of the potential challenges it can create.

11.2 Editing Preparation

The process of editing preparation should begin long before you sit down at an editing system to put together a program. Taking time to properly *prepare* for the editing process will pay off once the actual editing begins, and the extra time you spend in the preediting phase is likely to be more than made up for by the time you will save during editing. And, since editing time—either off-line or on-line, linear or nonlinear—is expensive, good preparation reaps financial rewards as well. In fact, you should begin preparing for editing before the first shot is recorded, and each step in the production process should be taken with the editing process in mind.

Whether it is to be edited using linear or nonlinear equipment, most footage is initially shot or recorded onto videotape. Although an increasing number of products record directly onto computer disk or memory card, tape is still by far the most common method of acquiring and storing video. For that reason, the

remainder of this chapter assumes that video footage is being acquired using tape. Although there are a wide variety of tape formats as discussed in Chapter 10, the basic process of gathering video and editing is the same no matter what format is being used. Of course, it is usually best to shoot your video using a format that is compatible with your editing system; otherwise, you will have to make a copy of your tape in the proper tape format and thus lose some quality from the original.

Shooting

The old adage “Shoot to edit” is a good admonition to keep in mind. To this end, you should follow not only the aesthetic rules discussed in Chapter 5 but also the directing methods discussed in Chapter 4. All tapes should be clearly and logically labeled to facilitate later use. Since most field tapes are less than an hour long, it is also frequently a good idea to set the time code hour to a different number for each tape. For example, the first tape could begin with time code 01:00:00:00, the second with 02:00:00:00, and so on. This can help speed the review and editing process, because the editor will immediately know that any shot with a time code reading of 02 hours must be on tape 2.

Review

Once all of the footage has been shot, you should critically and systematically examine the material. During the review phase, you should assemble a **shot log** that lists all of the shots on each tape. To facilitate review (and keep the original tapes from being damaged), you might make a VHS dub of all of the footage using a **time code burn-in**, as shown in Figure 11.3. This will allow you to see the time code points for all shots on a regular VHS recorder.

Decision Making

As part of the review process, you also will begin to make decisions about how the footage will be edited. This includes picking shots and deciding which takes of particular scenes will be used in the finished product. Although some final shot selection decisions will have to wait until editing actually begins, during the review and decision-making phases you will begin to



Figure 11.3

A dubbed VHS tape with time code burn-in shows the time code addressing from the original tapes.

assemble a preliminary EDL by hand, noting which shots will be used along with time code points. Selecting the shots to be used is especially important when using nonlinear editing, as this will determine which portions of the tape you will capture, as discussed in the next section.

11.3 Nonlinear Editing

An ever-growing number of nonlinear editing systems are available, ranging in price from a couple of hundred dollars to tens of thousands of dollars. The most popular nonlinear editing systems are the those made by Avid and Media 100 and the software-based Apple *Final Cut Pro* and Adobe *Premiere*.¹ At the most basic level, however, all systems are really nothing more than computers with specialized hardware to input and output video and audio, and specialized software (and sometimes hardware) to perform the editing functions. Some programs are designed around Macintosh computers (see Figure 11.4), while others are for Windows-based PCs.

The basic variables among nonlinear systems have to do with speed, quality of output, formats of video, graphics, audio accepted, input options, storage capacity, and sophistication and quality of special effects. Not surprisingly, the more features, speed, and quality you desire, the more you will have to pay for a nonlinear system. The \$200 system that turns your home



Figure 11.4

Apple's *Final Cut Pro* is a software-based nonlinear editing system designed for Macintosh computers. Screen shot courtesy of Apple computer, Inc.

computer into a nonlinear video editor may be fine for putting together wedding videos, but to do professional quality work you'll need something better. Systems designed for high-definition work, not surprisingly, are the most expensive.

Since such a wide variety of systems are available, and since each system has its own particular operating methods, this section discusses nonlinear editing in general terms, incorporating a few specific examples from a Media 100 editing system as an example. The only way to *really* learn how to use any nonlinear editing system is to study the manual and devote many hours to hands-on practice. This section gives you a running start.

File Management

Since the central element of a nonlinear editing system is a computer, considerations relating to managing data files are extremely important to the editing process. Before you begin editing, most nonlinear systems require you to create a "project" file that will hold the general information about the project you're working on. As you work on the project, you will create other files to save data contained in **bins** and **timelines** (as discussed later in this section). The bin, timeline, and other files are normally "associated" with a project file, meaning that when you open the project file later, the other files will automatically open along with it.

It is extremely important—especially in academic settings where several different people will likely be using the same machines—that you are careful about how and where you save your data files. Your school may have specific rules for naming files, but it is always a good idea to give all files descriptive names—containing your last name if possible. For example, the name "Foust Assignment 1 project" tells you (and others) a lot more about what the data are than a name like "My test 1." You also need to be aware of *where* you're saving your files—on what disk drive and in what folder. Again, your school may have specific guidelines for you to follow.

Since storage space is likely to be at a premium—especially in academic settings—you might have to move your data files off the machine during the times you're not editing. This can be accomplished by trans-

ferring the files over a **network** to a central server computer or by copying them onto removable media such as optical discs.

It is also important to make sure your data are backed up, or copied to another location. If you have a project that you've devoted many hours to and you experience a hard-disk crash or other mishap, you can lose all of your work. For that reason, you should save your data files frequently and be sure to make regular backups.

Raw Material—Capturing and Digitizing

Before any editing can take place on a nonlinear system, the raw material that will make up the completed presentation must be captured, or brought into, the computer. In the case of analog video, this process also involves **digitizing** (converting the analog signals to digital signals), which occurs as part of the capture process. The bulk of captured material is likely to be video footage, although graphics, animations, and audio files also can be brought into the computer as well.

As noted, most video footage is still gathered on tape, although with time an increasing percentage of video footage will be shot on nonlinear media such as hard disks. Individual pieces of captured information are called **clips**, which appear as icons on the computer screen. The individual clips are stored in a window called a bin.² (See Figure 11.5.)

To select footage to be captured, the editor designates an **in point** and **out point** on the tape, representing the beginning and end times of the clip. Using time code can help automate the capture process, but if your equipment doesn't have it, you can still designate clips using control-track numbers. Figure 11.6, for example, shows three clips to be captured from a section of videotape. For the first clip, the in point is 00:00:30:00 and the out point is 00:00:36:00.

You normally don't capture all of the footage you have available; doing so would be a waste of time and hard-disk space. Instead, as part of the edit-preparation process you should have compiled a list of the footage you'll need to complete your project. There is no point, for example, in taking time to capture footage of takes where talent flubbed lines or the lighting was wrong.

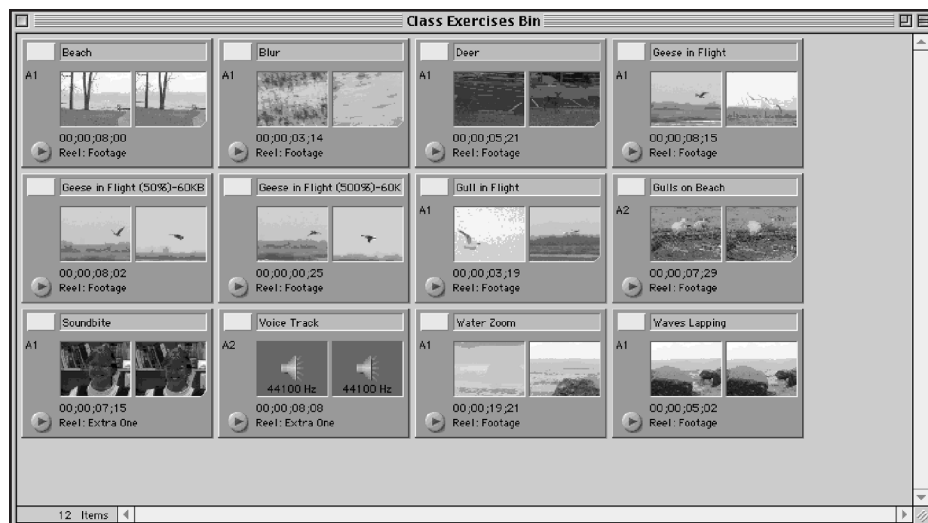


Figure 11.5

A bin window contains various clips to be used in an editing project.
 Screen shot courtesy Media 100, Inc.

Working from your list, then, you will only digitize the portions of the tape that are likely to be used in the project. You also can choose the quality level of the captured audio and video signals. When doing off-line editing, for example, it is likely you will capture at a lower quality level.

Most nonlinear editors allow you to keep track of where your captured footage came from. In other words, you make note of the particular tape that each shot was originally recorded on. This is particularly valuable if for some reason you have to go back and recapture a shot—you'll be able to tell exactly which tape it came from and, if you're using time code, exactly where on the tape it is.

Video and audio can be captured in three basic ways: (1) as an analog signal, (2) as a compressed or uncompressed digital signal, or (3) as a file transfer. The choices are similar to ways to **ingest** video onto servers discussed in Chapter 10, and, in fact, the basic idea is the same—we just use the term “ingest” for servers and “capture” (or **import**) for nonlinear editors.

Capturing Analog Signals

To capture analog signals, you simply connect the video and audio outputs of a videotape machine (either the one on the camera or a separate unit) to the in-

puts of the nonlinear editing system. This method can be used for either analog or digital **standard-definition** signals, and in fact is the *only* choice for analog signals.

Nonlinear systems have a screen interface that allows you to oversee the capture process (see Figure 11.7). In most cases, this interface lets you actually control the tape machine from the computer, meaning you can use the on-screen buttons to cue up the parts of the tape you want to digitize. If your system does not offer this option, you will have to operate the transport controls on the recorder itself. This method of capturing video takes place in real time, meaning that if you have an hour of footage to digitize, it will take you at least an hour. In practice, it is likely to take much longer than that once you count the process of cueing up various parts of the tapes.

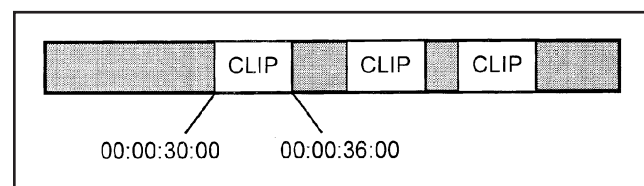


Figure 11.6

A sample raw tape showing three clips to be digitized. The first clip, as indicated, begins 30 seconds into the tape.

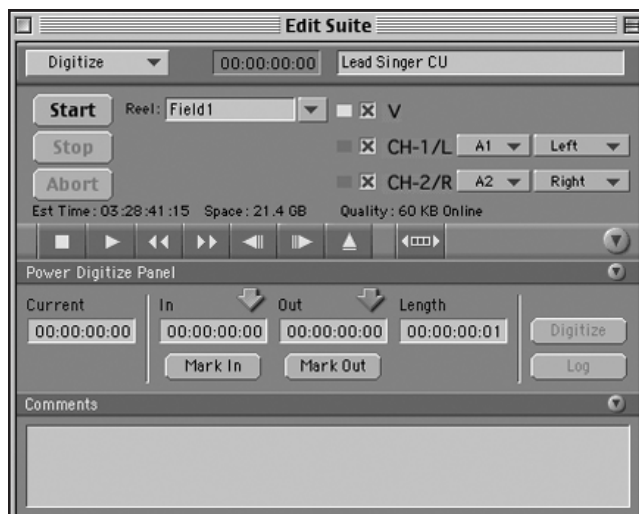


Figure 11.7

The capture window allows the editor to control the process of capturing video and audio.

Screen shot courtesy Media 100, Inc.

Capturing Digital Signals

If your video footage has been shot in a digital format, either standard definition or high definition, you can capture the data in digital form. To do this, you connect the digital output of the recorder (again, either the one on the camera itself or a separate unit) to the digital input of the nonlinear editor. This connection might be a **Firewire** (IEEE-1394), **serial digital interface (SDI)**, or some other type of connection. Depending on the system, you may be capturing compressed or uncompressed data.

As you are transferring digital bitstreams into the computer, the control interface will work the same way. You will use the computer to cue up the parts of the tape you want to capture. Some digital formats, as discussed in Chapter 10, allow four times speed digitizing, meaning you can digitize an hour of tape in 15 minutes.

Either analog or digital capture can be automated by the use of a **batch capture** function. Batch capture works by taking a “list” of begin and end points for clips and then capturing them all at once in a single pass of the tape. The list can either be created by going through the tape and marking the begin and end points as it plays, or by importing a text file into the nonlinear editor. Batch digitize saves the “start and

stop” time of alternately marking, then capturing clips one by one, but it still can be time-consuming. The advantage, however, is that once you have started the batch digitize process, you don’t have to do anything other than wait for the computer to finish. It’s a good idea, though, to not stray too far from the computer as you’re waiting, since systems can hang up or crash.

Batch capture also allows an editor to initially capture clips at low quality and work in off-line mode on creating a rough cut of the project. Once the rough cut is finished, the nonlinear editing system can recapture the clips at higher quality for on-line editing. In fact, once the clips have been recaptured, the nonlinear editing system can automatically apply the new, higher-quality footage to what the editor has already assembled. The actual on-line portion of the editing process, then, becomes less a reediting of the rough cut than simply converting the rough cut to master quality.

File Transfers

A third method of getting video footage into the nonlinear editing computer is by doing file transfers. If the video or audio you need to use is already on a server in your production facility, you can copy it to your computer’s hard drive. This method is by far the fastest, but it requires that the video or audio already be stored on a server. It also can be used if your footage has been recorded on a computer disk or memory card as part of the camcorder. Either way, copying the information is usually accomplished by dragging file or folder icons from the server’s folder to your local hard drive’s folder.

Editing—Clips and Timelines

Once all of the video clips, audio clips, and other media have been brought into the nonlinear editing system, you are ready to begin editing. The user interface of a typical nonlinear editing system consists of three main parts: the bin, which, as discussed, holds the individual media clips; the **clip window**, which is used to manipulate clips; and the timeline, which is where individual clips are edited together (see Figure 11.8).

Additional windows can be opened to perform other types of operations, such as audio equalization, graphic design, and transitions. The editor also can choose to have more than one bin or timeline as well. The use of multiple bins allows an editor to organize

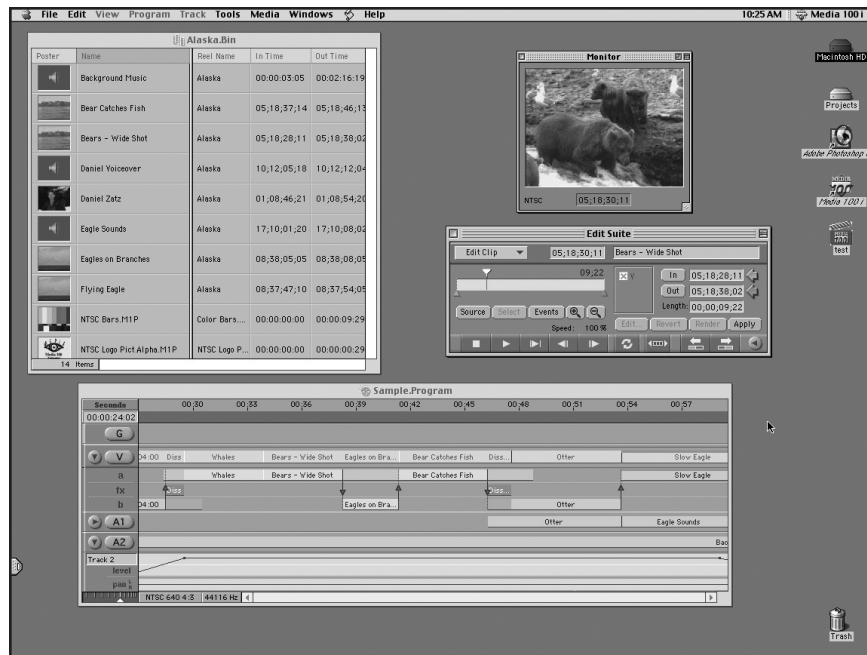


Figure 11.8

An overview of the main parts of a nonlinear editing system's user interface. At upper left is the bin, at upper right is the clip window, and below is the timeline. *Screen shot courtesy Media 100, Inc.*

an editing project either according to individual media (audio, video, and graphics) or according to parts of a program. Having more than one timeline allows the editor to simultaneously edit more than one version of a program—perhaps one program is being edited with a soundtrack in English while another is being edited with a Spanish soundtrack, for example.

In addition to video clips, the bin will contain other types of media files, such as audio clips, transitions, and special effects. If you want to create a sophisticated graphic in a program like *Adobe Photoshop*, for example, you could import the finished graphic into the bin. Double-clicking the mouse on an individual clip in a bin causes the clip to be displayed in the clip window, which allows the editor to make changes to the clip (see Figure 11.9). The length of a clip can be changed by dragging in-point or out-point locators, which correspond to the beginning and end of the clip, respectively. In points and out points also can be changed using the keyboard to type in a specific time code address.

In this way, individual clips can be precisely edited, a process called **trimming**. An important advan-

tage of nonlinear, however, is that even if a clip is shortened, it can be restored later to its original length. The editor also can apply special effects such as color correction or slow motion to a clip. In these cases, depending on the sophistication of the nonlinear system, the effects may be instantly applied or may have to be slowly “computed” in a process called **rendering**. When the editor has finished manipulating the clip, the new version of it is saved in the bin.

To begin editing, the editor simply drags a clip from a bin onto the timeline, then drags and places subsequent clips in the same manner. Alternately, on some editing systems you click a button or select a menu command to add a clip to the timeline. Clips that contain video and audio will appear in the appropriate channels on the program line; a clip that is audio only will only appear in an audio channel. Figure 11.10 shows an edited project consisting of three video clips with sound and a voice track in the second audio channel.

At any time in the editing process, you can play the entire program or only a portion of it. The downward-pointing white triangle with the vertical line attached



Figure 11.9

The clip window allows the editor to manipulate clips from the bin.
 Screen shot courtesy Media 100, Inc.

indicates where in the timeline you are playing. To play just a portion of the program, you drag the triangle to the place you want to begin. As you drag it, you will see the program play in fast motion on the monitor. The timeline window also can be adjusted for how much of the program you want to see by dragging the scale indicator (the upward-pointing white triangle in the bottom left of the window). The timeline window shown in Figure 11.10 is set to show three-second increments across the top of the time scale. If you wanted to perform editing functions in precise detail, you could set the timeline to show a much smaller portion

of the program by dragging the scale indicator to the left. Alternately, dragging it to the right will allow us to see *more* of the program. It is important to point out that these changes only affect how you *view* the program clips in the timeline window; it doesn't actually change the length of the clips or the program itself.

Clips on which the video and audio were captured together are said to be *synchronized*, meaning they are locked together. The "Deer," "Waves Lapping," and "Beach" clips shown in Figure 11.10 are synchronized. Normally you want clips to be synchronized in this way; the person's lip movements should match the audio of his or her

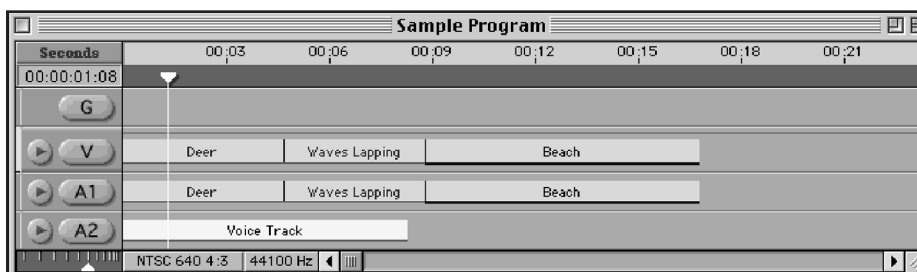


Figure 11.10

A sample project edited on the timeline. Screen shot courtesy Media 100, Inc.

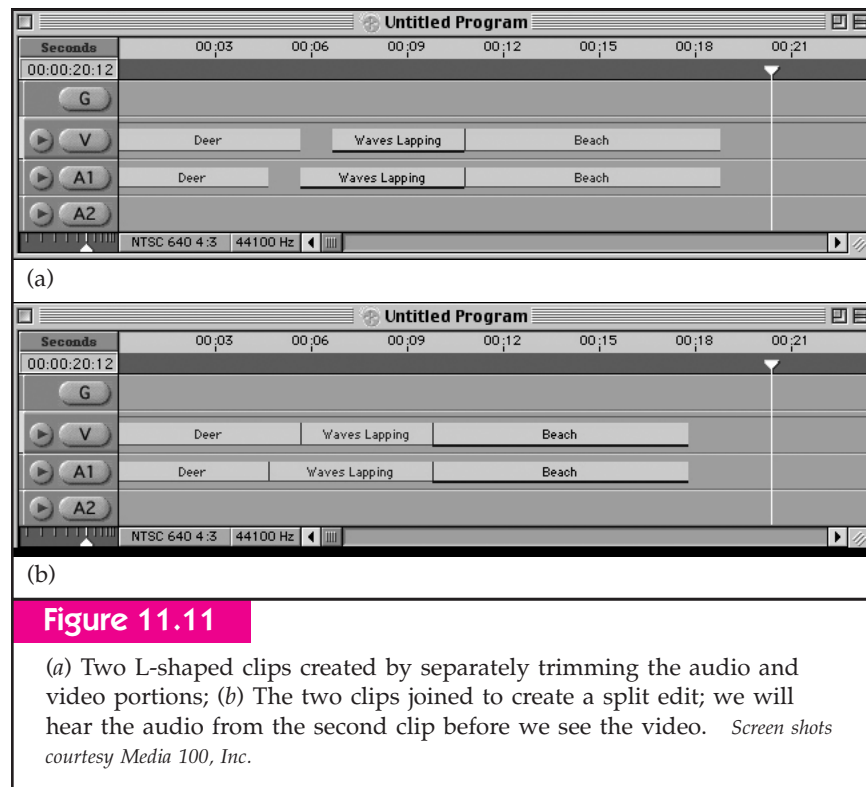
voice, for example. However, at times you may want to unsynchronize the audio—if you wanted to remove the audio portion of a clip but leave the video, for example. To do this, you simply click on the clip in the timeline and select a menu command to unsynchronize it.³ The clip’s audio and video indicators in the timeline will change color to show that they are no longer synchronized, and then you can simply click on the audio portion of the clip and press the “delete” key to remove it. The clip still exists in its full form in the bin window; if you want to get the audio back you can simply recopy the clip from the bin to the timeline. Alternately, you could simply select the “Undo” menu item to “take back” the removal of the audio.

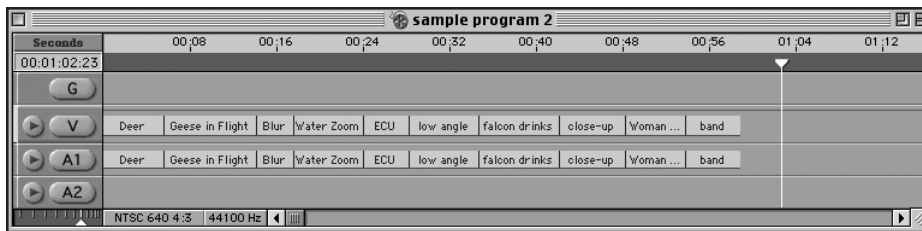
Clips in the timeline can be manipulated by dragging them with the mouse. Clicking near the edge of a clip will expand or contract it; clicking the left side of the clip changes the in point, while clicking the right side changes the out point. Normally, you change the in or out points of *both* the video and audio portions of a given clip in this way; however, if you want to change the in or out point of only one of the elements, you can do so. In the case of the Media 100, you simply

hold down the “Control” key on the keyboard as you drag the end of the clip—only the portion you’re dragging (video or audio) will change.

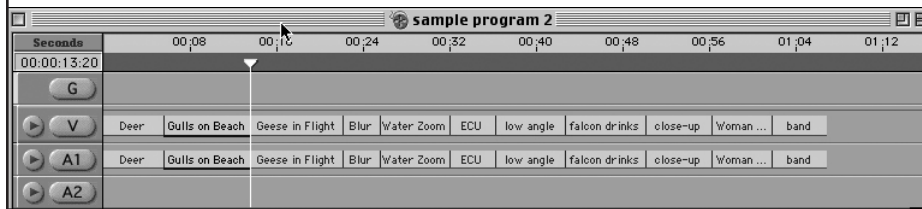
You can use this technique to create a **split edit**, one in which the audio and video portions of a shot change at different times. For example, say you wanted to hear the sound of the waves lapping clip for a second before you actually *see* the shot of the waves lapping. You would simply move the out point of the audio portion of the “Deer” clip back one second, and move the video portion of the “Waves Lapping” clip ahead one second. This would create two “L-shaped” clips, as shown in Figure 11.11(a). The clips could then be dragged together to create the split edit, as shown in Figure 11.11(b). When you play back this sequence, you will hear the sound of the waves lapping for one second before you see the waves lapping shot.

As alluded to in the beginning of this chapter, one of nonlinear editing’s great advantages is its ability to overcome the temporal limitations of linear editing. For example, imagine that you had edited the program shown in Figure 11.12(a), consisting of 10 shots with a





(a)



(b)

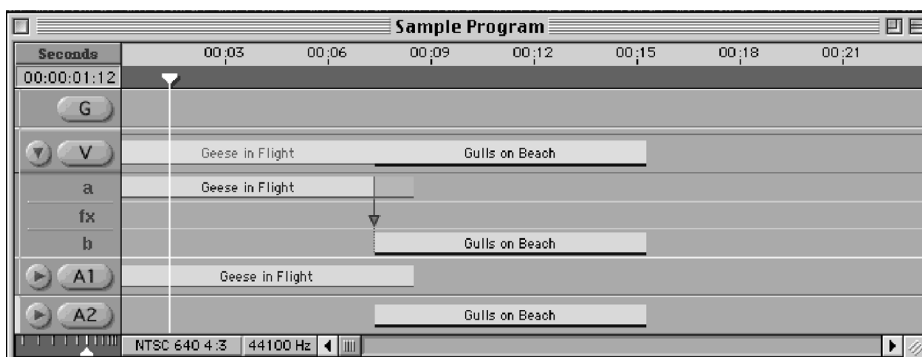
Figure 11.12

(a) A series of shots edited on the timeline; (b) a new shot is added near the beginning of the program, and the succeeding shots automatically “ripple” to make room. *Screen shot courtesy Media 100, Inc.*

total length of approximately one minute. Now, suppose you had forgotten to put a shot (“Gulls on Beach”) between the first and second shots in the program—you still need all of the other shots to be the same length, but you need to add the new shot. With linear editing, your only choice would be to edit in the new shot and then reedit all of the other shots that come after that—there is no way that you can “stretch” the tape and just insert the new shot. With nonlinear editing, however, you *can* actually “create” time in the middle of a presentation, and it is remarkably easy to do so. You simply select the

new clip in the bin and then tell the editing software to insert it between the first and second clips. The editing software automatically “ripples” the clips following the new one, as shown in Figure 11.12(b).

To perform a transition other than a cut, the editor overlaps video clips in two separate video channels, as shown in Figure 11.13. On the Media 100, the overlap area represents the duration of the transition, although some nonlinear editors do not require you to overlap clips in this way. By bringing up the transition dialog box, you can select the type of transition you want—

**Figure 11.13**

Performing a dissolve between two video clips with a nonlinear editing system. *Screen shot courtesy Media 100, Inc.*

dissolves, wipes, DVE effects. Nonlinear editing systems normally have a variety of transitions available, similar to those discussed in Chapter 9. Depending on the type of transition and the sophistication of the nonlinear system, the transition may have to render or may be immediately viewable.

Most nonlinear editing systems also have onboard graphics and titling capabilities. Using the title editor, you can make full-screen graphics, or graphics that can be keyed over video.

Output

A “finished” nonlinear editing presentation initially exists only as a series of digital data bits inside the computer’s memory. Depending on the application, the finished presentation can be dubbed onto tape, or recorded onto a video server. Alternately, the program can be recorded onto an optical disc, or saved as a **streaming** file for use on the Internet (see Chapter 13). If the nonlinear editing was conducted as an off-line session, the most important output might be the computer-generated EDL, which then will be transferred to the on-line editing system.

Dubs to tape are made by simply playing the completed program with a tape machine attached to the nonlinear system’s outputs. Some systems can be set up to automatically create and play back color bars, audio tones, slates, countdowns, and black signal before making the actual dub of the program. “Recordings” to a video server or other digital media are usually made by copying the finished data files.

11.4 Linear Editing

Although there are many different configurations of linear editing systems, they all consist of at least three elements: a playback tape machine, a record tape machine, and an **edit controller** that operates the two tape machines in synchronization. (See Figure 11.14.) The edit controller allows the editor to perform basic videotape recorder functions such as playback, record, fast-forward, rewind, and search on each machine that is part of the editing system. The editor also uses the edit controller to set in and out points that designate the beginning and end of edits and to select the type of edit to be performed.



Figure 11.14

A typical edit controller for linear editing.

Once an edit has been prepared, the controller then synchronizes the playback and record machines and carries out the edit on the record machine. It synchronizes the machines by performing a **preroll**, which backs up each machine a few seconds before the edit point, then plays back the machines in unison to be sure they are running at exactly the same speed when the edit begins. At the conclusion of an edit, the edit controller stops all machines and normally recues them to the end of the edit.

Edit controllers vary widely in sophistication and capability. Most have digital time readouts that allow the editor to cue tapes and determine the length of edits. On systems without time code, these counters numerically display **control track** pulses, while on time code systems they display the actual time code addresses. More-sophisticated edit controllers also can control switchers, **DVE** units, and other devices.

Linear Editing Configurations

The most basic editing system, consisting of a playback machine, a record machine, and an edit controller, is called a **cuts-only** system. As its name implies, this type of system is capable only of editing cut transitions between shots.

To perform other types of transitions, you must use an **A/B roll** or **multiple-source** editing system. This type of system uses more than one playback machine, then allows the editor to perform transitions between footage on the playback machines. Another way to perform advanced transitions is by using a digital recording machine with **preread** function, in which the

recorder actually plays back the footage on its tape while simultaneously adding footage from the playback machine.

Several peripheral pieces of equipment may also be included in an editing system. The most basic of these is one or more video monitors that allow the editor to view the footage on the various tape machines. Similarly, audio monitors are used to listen to audio sources. In a multiple-source system, a switcher, DVE unit, and graphics unit may be used to create more-sophisticated editing effects, and each of these components may have its own video monitor. An audio mixer may be used to more precisely control the level and equalization of audio sources, which may include CD players, cart machines, and cassette tape players.

A final variable among editing systems is tape format. Normally, all the machines in an editing system are the same format, although in **interformat** editing systems there may be a mixture of formats. For example, an edit system may record onto Digital Betacam but allow both Digital Betacam and DVCPRO source tapes.

Types of Tape Edits

Audio or video information can be recorded onto tape during an edit session in two basic ways. The first of

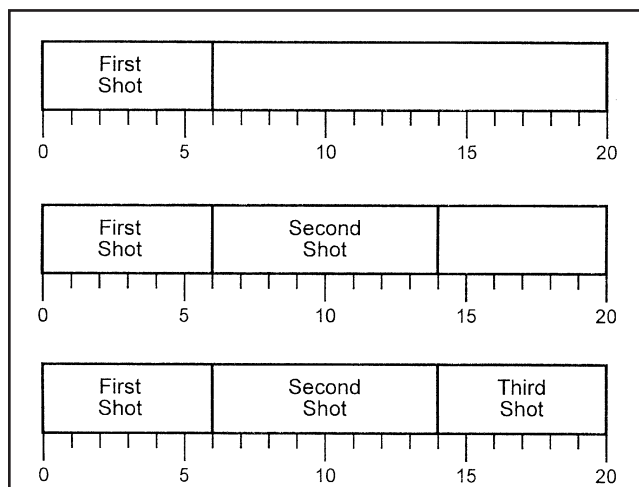


Figure 11.15

Assemble editing is useful for editing a series of shots one after the other.

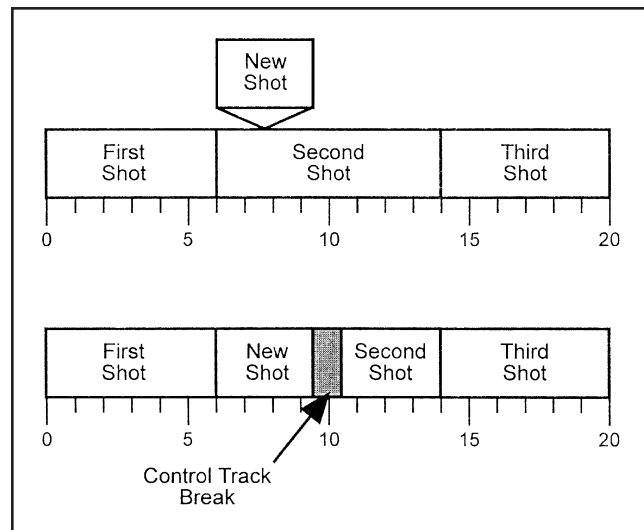
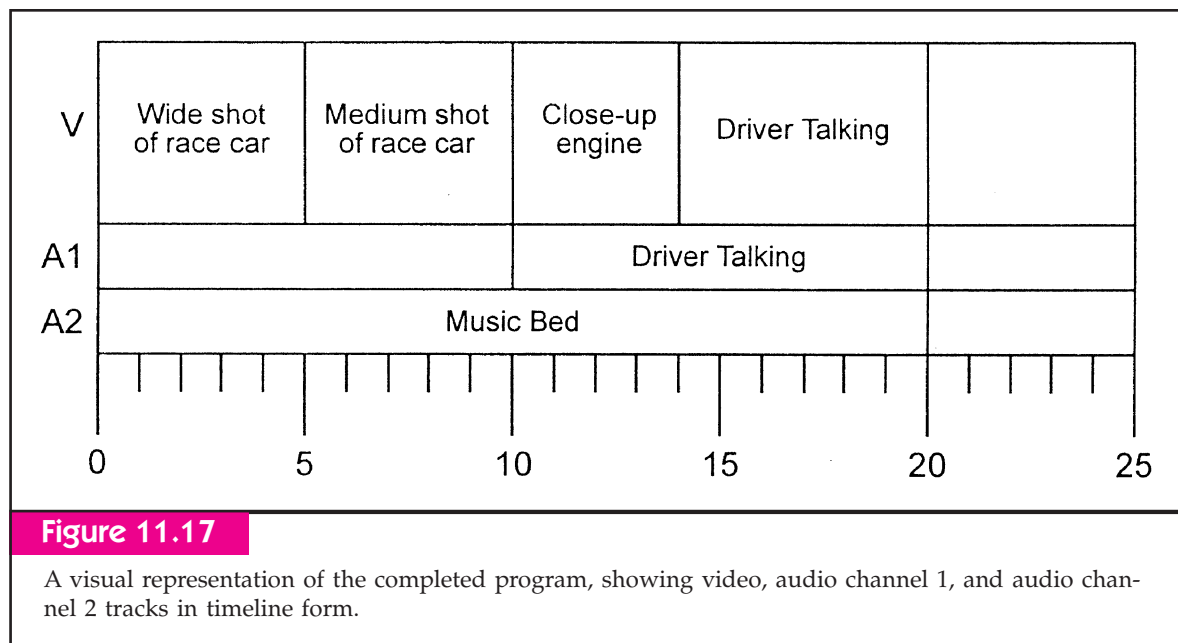


Figure 11.16

Assemble editing a shot in the middle of a completed program causes a break in the control track, and all shots after the break have to be reedited.

these, called **assemble editing**, records all tape elements (video, all audio channels, and control track), essentially wiping out any previous material recorded on the tape. Assemble editing is useful for simple editing functions, such as placing a series of shots one after the other, as shown in Figure 11.15. However, since it records *all* tape elements, it cannot be used to edit a shot in the middle of a presentation because it will cause a break in the control track, as shown in Figure 11.16. Obviously, assemble editing cannot be used to change an individual element (video or audio channel 1, for example) in a presentation.

More-advanced editing functions require the use of **insert editing**, which allows the editor to select individual elements (video and/or specific audio channels) to record. Since it does not disturb the control track, insert editing can be used in the middle of an edited presentation. Insert editing gives the editor much more capability than assemble editing, and for that reason it is the kind of editing most often used. However, before you can perform insert editing, you have to have the control track already on the record tape. If you want to begin insert editing on a blank tape, you must first **black** the tape by recording the control track (and usually a black sync signal) onto it. If you have



already used assemble editing to lay shots on the tape, you can then go back and use insert editing to change individual shots.

Linear Editing Techniques

Despite the wide diversity of edit controllers and tape machines, the basic techniques of tape-based editing remain the same. This section uses a simple editing example to illustrate some of these techniques.

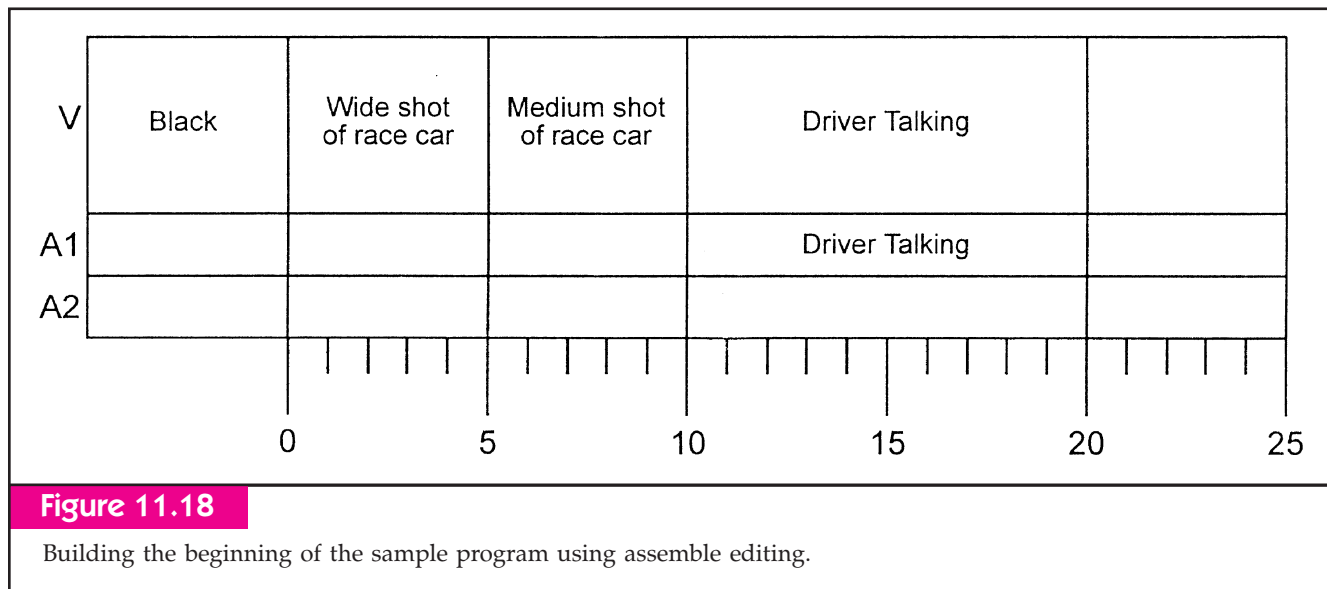
Suppose that you have a raw tape with various footage on it. You want to rearrange this footage into the completed form shown on the edit master tape in Figure 11.17. The finished program begins with a five-second wide shot of the race car, then a 5-second medium shot of the race car. Next, there is a 10-second interview clip in which the driver talks about the race car; the first 4 seconds of the interview clip are covered with a close-up shot of the car's engine (in other words, we hear the driver talking for 4 seconds before we *see* him). Throughout the entire program, we have a music bed.

This program can be completed in several ways, but for our example we will build its basic structure using assemble editing, then complete it using insert editing. The first step is to perform a **cold edit** at the very beginning of the edit master tape. This is accomplished by simply pressing the "record" and "play" buttons on the recorder and letting the tape record

black sync signal for at least 10 seconds. This is done because we need to have space for the edit controller to preroll the first edit. If we simply tried to do an edit at the very beginning of the edit master tape, the recorder would "run into" the beginning of the tape while attempting to preroll, and the edit controller would abort the edit. The 10-second black recording at the beginning of the tape will provide sufficient space for the preroll (which is normally set to between 3 and 7 seconds, depending on the edit controller).

Now, we are ready to begin building the program. First, we will use the edit controller to cue the edit master tape to 10 seconds; then we will press the "set in" button on the edit controller to tell the machine that we want the first shot to begin at that point.⁴ Next, we use the edit controller to cue the raw tape to the wide shot of the car. Again, we will use the set in button to set the beginning of the shot on the raw tape. Finally, we will tell the edit controller that we want to perform an assemble edit by selecting "assemble" under edit type.

We are now ready to perform the first edit. In this case, it will be an **open-ended edit** because we have not set an out point to designate the end of the edit. When we press the "edit" button on the edit controller, it will preroll both the player and recorder to five seconds before their respective in points, and stop the machines momentarily.⁵ Then, it will roll both machines



in unison, and when we reach the in point of the record tape we will see the shot of the race car appear on the record monitor. When we have at least five seconds of the shot recorded, we will press the “all stop” button to stop both machines; the edit controller will then recue both machines to the point when we pushed the “all stop” button.⁶ We are now ready to recue the machines, set in points, and do our next edit.

After similarly assemble-editing the next two shots, we end up with a program as illustrated in Figure 11.18. Now, we need to make two insert edits to complete the project. The first of these will be a video-only edit for approximately the first 4 seconds of the sound bite. We want the shot of the engine to end after the driver says, “This car has the most powerful engine of any car on the track.” We will use the edit controller to cue the recorder to the beginning of the sound bite, cue the player to the shot of the engine, and set in points on both machines. Since we want the engine shot to end after the driver says “any car on the track,” we will use the edit controller’s shuttle/search knob to cue the record tape to just after the word *track*, then set an out point on the recorder. This tells the edit controller to end the edit at this point. Out points can be set on either the record machine or the playback machine, depending on the situation. In this instance, the critical ending point (the word *track*) is on the recorder, so we set the out point on the recorder. Finally, we will select only “video” under edit type, as we do not want to record any audio.

We are now ready to perform the edit, but in this situation we may want to “test” the edit to make sure it works as planned. Edit controllers allow us to do this through the use of a **preview** function, which rolls the machines through the edit-preparation process, then shows what the edit will look like without actually recording it. When we press the “preview” button on the edit controller, both machines will preroll, then play. If we watch and listen to the record monitor, we will see the engine shot inserted, but the machine will not actually perform the edit. If something is wrong with the edit (if the engine shot ends on the word *car*, for example), we can reset the in or out points. We can do this by just recueing the recorder to the proper location, then pressing “set out” again, or by trimming the existing edit. Trimming increments an existing in or out point frame by frame, normally by pressing a “+” or “-” button on the edit controller. If we press the “+” button 10 times, for example, the out point will be moved 10 frames later. Once we are satisfied with what we see, we will perform the edit by pressing the “edit” button. If we wish, we can look at an edit just completed by using the **review** function. We will complete the project by doing an audio channel 2 insert edit to add the music track under the entire program.

This is the basic process of linear editing: cueing tapes, setting in and out points, and designating the type of edit. More-advanced controllers allow greater usability and functionality, such as the ability to set in

and out points numerically on a keypad, or to perform transition effects on multiple-source systems.

11.5 Editing Aesthetics

A finished television program, be it a live talk show, a sitcom, a game show, a documentary, or a news program, should create for the viewer an uninterrupted sense of visual and aural progression. This consistent and unobtrusive “flow,” as discussed in Chapter 4, is called **continuity**, and it is a function of several aesthetic considerations. In fact, many television professionals say the best edits are the ones the home viewer doesn’t even *notice*.

Continuity allows you to create a sense of uninterrupted flow not only in real-time productions such as talk shows and live sports programs but in programs where time and/or space are fluid. For example, a documentary may contain footage shot over a period of days, months, or even years, and in several different locations. In a television drama, we may want to create the impression that the actor puts on his jacket, leaves his house, gets in his car, and drives away as one continuous action, despite the fact the scene was in reality shot in several different “takes” over a period of several hours. In that same drama, we may at another time want to smoothly travel to another time or place—10 years ago or a city located hundreds of miles away. Skillful editing can make all of these actions unobtrusive and *believable* to the viewer.

Regardless of how you are editing, whether linear, nonlinear, or in real time using a switcher, achieving continuity is as much a function of the shots you have available as how they are put together. Indeed, the degree of continuity you are able to achieve is often determined in the preproduction and editing-preparation stages of a project. This is, once again, another reason that *planning* is so important in television production.

Of course, continuity considerations are often violated for special effect, especially in music videos and commercials, where smooth flow is abandoned for attention-grabbing, disjointed editing. Here, too, however, it is important that the loss of continuity serves a creative purpose and is appropriate to the production in question. It is usually not appropriate, for example, to violate continuity in a documentary or a live studio

production. Still, television production is a creative endeavor, so principles of continuity should be considered guidelines and not necessarily rules.

When to Edit—Information and Action

In general, you should change from one shot to another only when there is a specific *reason* for doing so. Broadly, these reasons fit into two categories: **cutting for information** or **cutting on action**. Cutting for information means that the second shot reveals information that the first shot did not. For example, we may cut from the medium shot of the show host holding the book to a close-up of the book so that the viewer can see the title of the book or the detail of the artwork on the book’s cover. (See Figure 11.19.) During a discussion show, we would want to cut from the shot of the host to a shot of a particular guest when that guest starts talking. If what the guest says elicits an enthusiastic round of applause from the audience, we might want to cut to a wide shot of the audience.

It is important *not* to make a video edit if that edit does not reveal any significant information. For example, cutting from the medium shot in Figure 11.20(a) to the slightly tighter medium shot from a similar angle in Figure 11.20(b) serves no real purpose. We are not giving the viewer any new information of significance, so it is best not to make the cut.

The transition to high-definition formats will make frequent cutting among shots less critical to visual storytelling. HDTV’s increased picture resolution means that you can show all the detail of a standard-definition close-up shot (and more) in an HDTV medium or wide shot. For example, consider a baseball game in which the pitcher is preparing to pitch to a batter as a runner leads off from first base. In a standard-definition production, the director would have to cut among at least three cameras to follow the action: a camera to show a medium shot of the runner on first base, a camera to show a close-up of the pitcher watching the runner and preparing to pitch, and a camera to show a wide shot of the pitcher and batter as the ball is delivered to home plate. These three different camera shots are needed because standard-definition’s lower resolution does not allow great detail to be seen in medium and wide shots. The camera

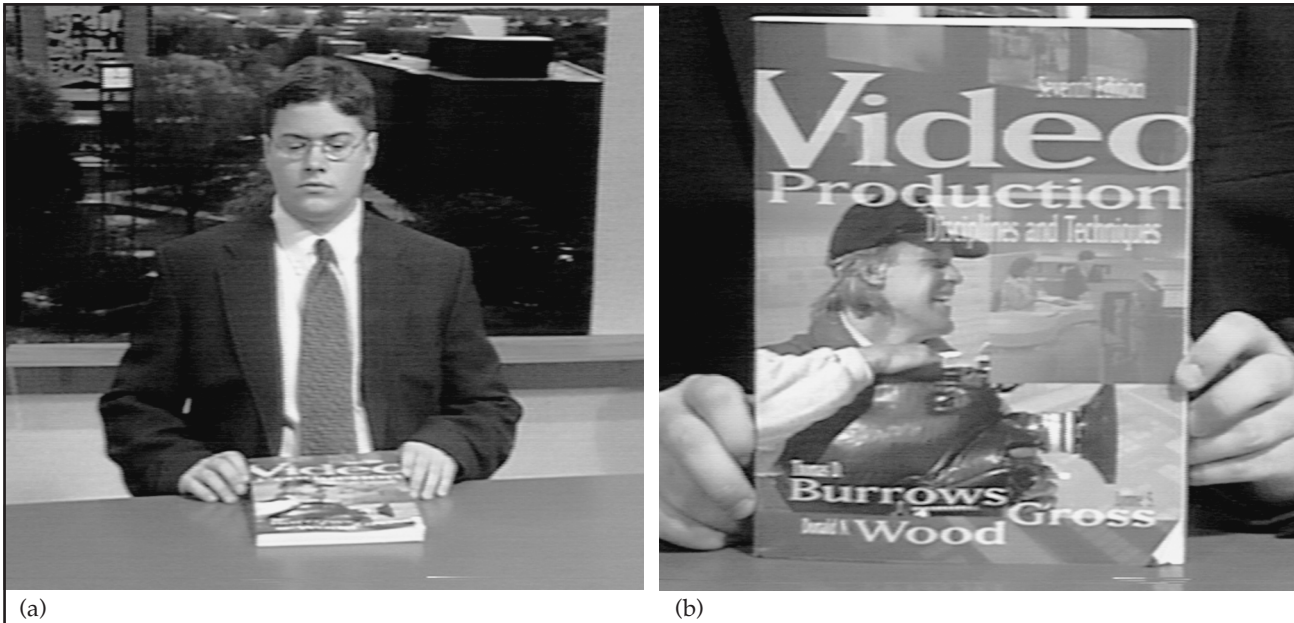


Figure 11.19

Editing for information. Start with the medium shot (a), and when the host holds up the book, cut to a close-up of the book's cover (b).

showing the runner on first could zoom out to show the pitcher as well, but there would be no way to see the concentration on the pitcher's face or the movement of his eyes from home plate, to the runner on first, and back to home plate.

With HDTV's greater resolution, however, a camera could get a shot of both the runner and the pitcher while maintaining enough picture detail to see the emotion on the pitcher's and the runner's faces. Thus, there would be no need to cut to the extra shot. In fact,

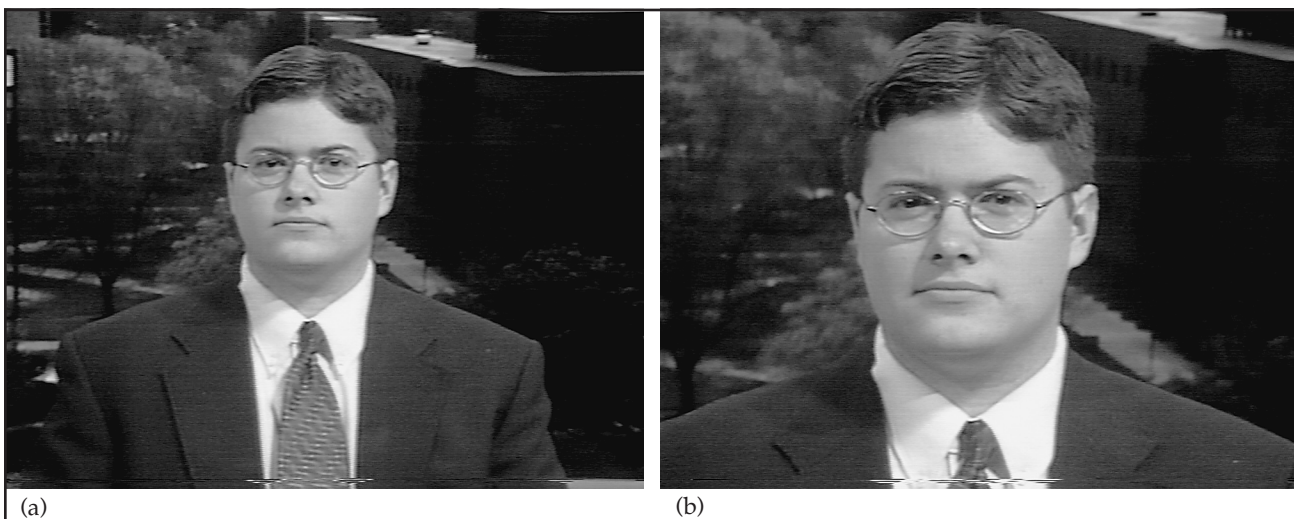


Figure 11.20

If no significant new information will be revealed by an edit, it should not be made. The shot shown in (b), for example, reveals no information not already shown in (a).

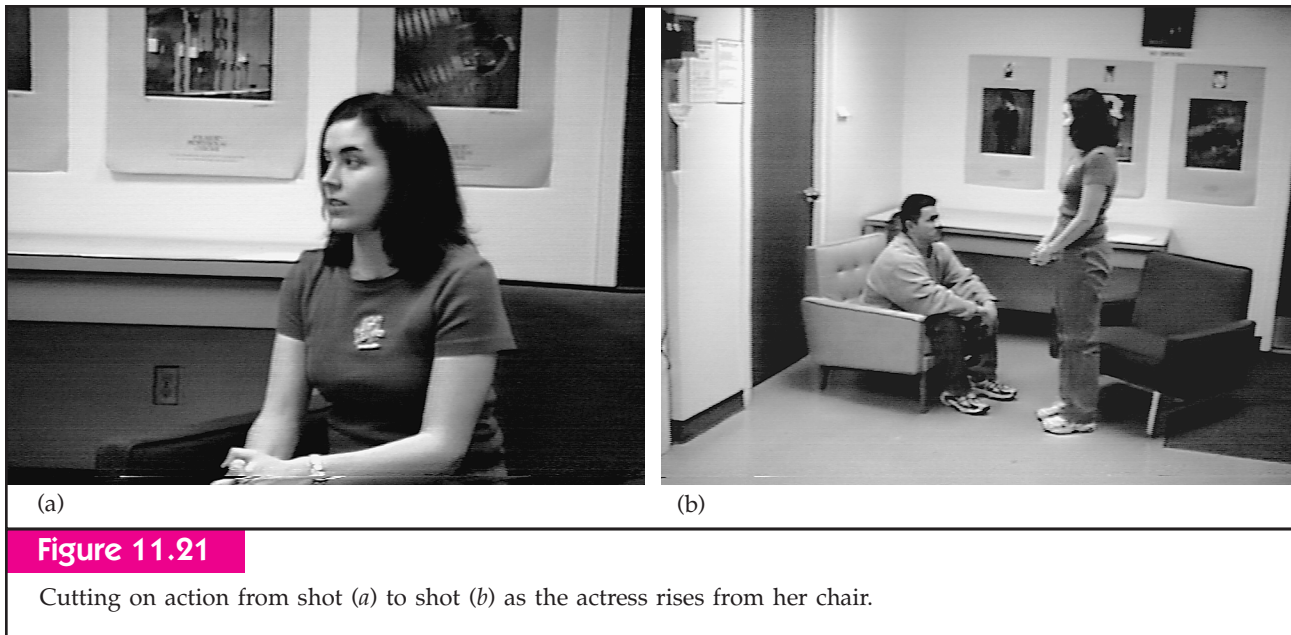


Figure 11.21

Cutting on action from shot (a) to shot (b) as the actress rises from her chair.

an HDTV camera positioned near the third-base dugout could shoot the runner, pitcher, and batter in one wide shot while maintaining nearly all the detail we would see in three standard-definition shots.

Cutting on action means the edit is triggered by an action of a subject in the picture. For example, if the actress is about to rise from her chair, we could cut from a medium shot of her to a wider shot, as shown in Figure 11.21. Similarly, if we are on a medium shot of a police officer questioning a witness to a crime and a gunshot rings out, the police officer is likely to spring to attention and perhaps draw his gun. This would be an appropriate place to cut to a tighter shot of the police officer as he turns his head in the direction of the gunshot, then perhaps cut to a wide shot of a suspect scurrying away down the alley.

It is important to note that the action not only triggers the edit, it also provides the temporal *point* for the edit. The edit, then, should take place just before the action occurs, or in some cases just after. Either way, the edit point needs to be in *very close temporal proximity* to the action. Cutting to the second shot in Figure 11.21 two seconds after that actress actually gets up, for example, destroys the logical sense of making the cut created by the action.

Pacing refers to the overall speed at which shot changes are made in a production. A fast-paced pro-

duction, for example, will have a lot of edits, and individual shots will be on the screen for only a short period of time. There is no “right” number of edits to make in a production, nor is there a set time between edits; the most important thing is that the pacing is appropriate to the particular production, and that the individual edits themselves are motivated by logical information and action cues. A music video, for example, is likely to have a much faster pace than a documentary. It also is important not to simply edit formulaically, such as changing pictures every three seconds. This can give an impersonal, automated feel to a presentation. Instead, edits should be made at appropriate points—the end of a sentence on the narration track in a documentary, for example, or on the beats of the music.

Jump Cuts

One of the goals of continuity in editing is creating the notion in the mind of the viewer that he or she is watching action occurring in real time, even if it is not. Perhaps the most glaring violation of continuity is the **jump cut**, in which a person or object changes in two successive shots. For example, if you edit a shot of a person typing at a computer immediately after a shot of that same person standing, as in Figure 11.22(a), you



Figure 11.22

(a) A jump cut; (b) using a cutaway shot prevents jump cuts; (c) changing angle or type of shot can also prevent jump cuts.

have created a jump cut. Such an edit creates confusion for the viewer, as it is physically impossible for a person to instantly go from standing to sitting at a computer.

A jump cut also can occur in less glaring forms. For example, if you cut from a shot of a man sitting on a chair with his left leg crossed over his right leg to another shot in which his *right leg* is now crossed over his *left leg*, this is in effect a jump cut. Similarly, it is a jump cut if a person's clothes change from one shot to the next or if an object sitting on a table is gone in the next shot. Many of these types of problems can be so minor that they go unnoticed; still, every effort should be

made to avoid them. If you watch movies or television dramas very closely, you can usually see a number of minor (and sometimes major) jump cuts like these.

As you might guess, jump cuts such as those just described are a much greater problem in postproduction editing than in live editing. Laws of physics prohibit someone from changing position from one shot to the next in a live production. Still, many people consider it a jump cut when an edit such as the one in Figure 11.20 is made. The person has not changed position, but the effect is so jarring that in actuality it seems as if the camera itself has "jumped."

Jump cuts can be avoided by using **cutaway** shots, in which a shot that does not include the person or object in question is inserted between the two shots. In the computer example, you could put a shot of the person to whom the subject is speaking between the two shots, as shown in Figure 11.22(b). Jumps also can be avoided by changing angles or shot type. You could in this way effectively cut from the shot of the person standing to a close-up of the person's hands on the computer keyboard to the medium shot of the person at the computer, as shown in Figure 11.22(c). Even though the first edit is technically a jump cut, the dramatic effect created by cutting to the close-up shot masks the violation of continuity for the viewer.

Another way to avoid jump cuts is to allow subjects to leave or enter the frame. In the preceding example, if we started by showing a shot of the person walking and allowed him to walk *out of the frame*, we could then cut to the shot of him sitting at the computer. Since the person actually leaves the picture (if only for a brief moment), our next shot will not create a jump cut. Similarly, if we cut from a shot of the person standing away from the computer, then cut to a shot of the computer and allow the person to walk *into* the picture, sit down, and start typing, we have not created a jump cut.

Axis of Conversation/Axis of Action

The **axis of conversation** is an imaginary line drawn between two people who are facing each other. In shooting such a conversation, all camera positions should be kept on one side or the other of the line. Doing so maintains consistent *screen direction*, the direction in which a person (or object) is facing. As shown in the first three frames of Figure 11.23, this maintains the effect that the two people are actually talking *to* each other. In editing shots in this sequence, you would make sure that the man was *always facing right* and the woman was *always facing left*. By **crossing the line**, or moving to the other side of the axis of conversation, you disrupt the consistency of screen direction, as shown in the last frame of Figure 11.23. It is important to note that there is no universally *correct* side of the axis of conversation from which to shoot; the point is that once you've selected one side or the other you should stay there.

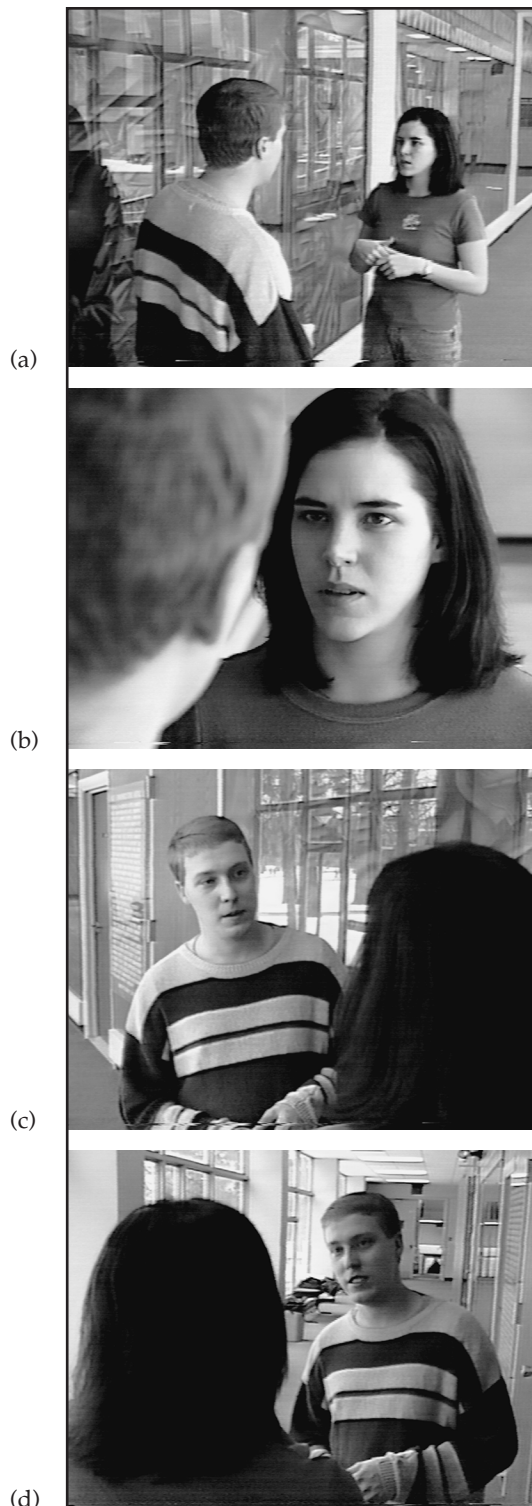
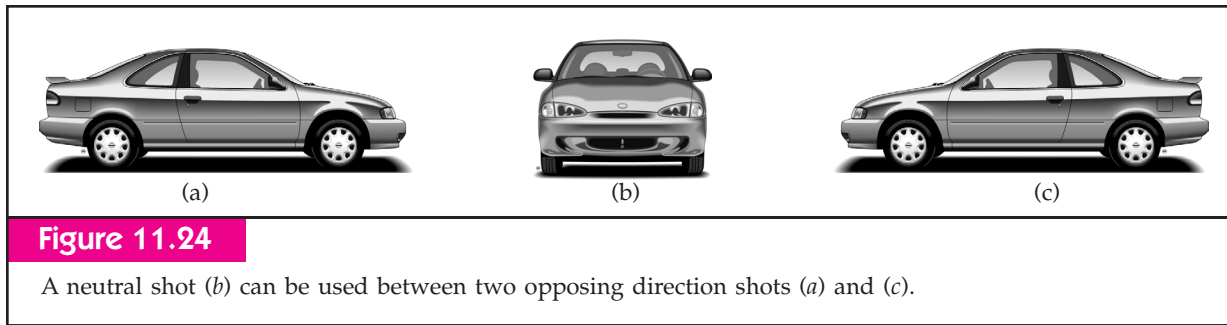


Figure 11.23

Maintaining consistent screen direction for two people. The last shot shows the disorienting effect of violating consistency of screen direction.



Similarly, the **axis of action** applies to moving persons or objects. If you are shooting shots of a car, once you've established that the car is moving in a particular direction (left to right, for example), you should only edit shots in which the car is moving in that same direction. Editing from a shot in which the car moves left to right to one in which it moves right to left creates a jarring effect and violates continuity. If you must edit together shots in which the car changes direction, you can insert a **neutral shot**—or head-on shot—between the two shots, as shown in Figure 11.24.

Transitions

The majority of edits are simply cuts, where one picture is instantaneously replaced by another on-screen. The reason for this widespread use is that the cut is the only transition effect that does not normally call attention to itself (unless it is a jump cut or other continuity violation). However, other transitions can and should be used in appropriate situations. The dissolve is most often used to indicate the passage of time, such as dissolving from a World War II photograph of a soldier to a contemporary shot of the same person. Dissolves also can be used to visually *connect* two images; changing from a shot of the soldier riding on a train to a shot of his wife back home holding his picture connects the two images more forcefully than a cut. A dissolve to or from black, usually referred to as a **fade**, indicates a strong separation. It is usually used to end a particular sequence or go to a commercial.

Wipes and special effects such as page turns call even greater attention to themselves, and thus they should not be used when subtle transitions are needed. These transitions can be used to create interest and ac-

tion in a presentation, however, and are often used (and many would say used *too much*) in commercials. In general, if you do not have a specific creative reason for using a dissolve, wipe, or special effect, you should just use a cut.

Ethics of Editing

The ability to edit sound and pictures gives the editor tremendous power to shape what the audience sees. Editing can be used to distort reality (such as by instantly transporting the viewer through space or time), create illusions, and—at its most extreme—create alternative realities (such as computer-generated animations). However, this tremendous power carries with it an *ethical responsibility* not to mislead the audience in inappropriate ways.

This ethical responsibility is most important when producing nonfiction programs, such as news, news features, and documentaries. Although a viewer expects and accepts the distortion of reality in entertainment programming, a viewer does not expect distortion in programs that claim to present reality. Common techniques used in the production of entertainment programming such as staging events, giving cues to actors, and editing to create illusions *should not* be used in nonfiction programs. Such programs should be a reflection of reality, and—as much as possible—the production and editing process should not interfere with or distort this reality.

It also is unethical to use editing to create false impressions in nonfiction programming. This includes editing sound bites so that the person seems to say something he or she really didn't. It also includes editing together shots that do not belong together to create

an inaccurate impression (such as following a sound bite from a politician with raucous applause from the audience when the audience didn't respond that way).

The evolving new technologies of video editing still give the producers of nonfiction programs tremendous new capabilities and artistic possibilities. It is important to remember, however, that these capabilities should not be used to mislead the audience.

Discussion Questions

1. Envision an editing project you might do for this class, such as a 30-second commercial or a two-minute news story. Would it be easier to complete this project using linear or nonlinear editing? Why?
2. If you were to begin shooting a video project tomorrow, what things would you do in the preediting stages to help facilitate the editing process?
3. If your school uses nonlinear editing systems, locate some of the video data files on the computer. How does their size compare with other types of

computer files such as word-processing files or graphics files?

4. If your school uses linear editing systems, how would you describe them? Are they cuts only or A/B roll? Do the machines use preread?

Notes

1. You can find more information about these systems at their respective websites: <http://www.avid.com>, <http://www.media100.com>, <http://www.apple.com/finalcutpro>, and <http://www.adobe.com/products/premiere/main.html>.
2. On some systems, the bin may be referred to as a "library" or a "browser."
3. On some systems, you may click on a small "padlock" icon to sync or unsync clip components.
4. Depending on the editing system, edit point set buttons may be called "edit in," "in point," or "in" as well.
5. Depending on the editing system, this button may be called "perform," "auto edit," or "edit start."
6. Depending on the editing system, this button may be called "edit stop" or "stop."