Programme : Bachelor of Science (First Year)

Subject : Generic Elective - Computer Science

Semester : I

Paper Code : CSG104

Paper Title : Multimedia and Web Design

Unit III : Multi-media Storage Devices

Module Name : DVD and Blu-ray Disc

Module No : 09

Digital versatile disc or digital video disc

A **DVD** or **DVD-ROM** is a disc capable of storing a significant amount more data than a standard compact disc. DVDs are widely used for storing and viewing movies and other data.

How much data can a DVD hold?

DVDs have differing capacities.

- One of the most common DVDs is the single-sided, single-layer disc, capable of holding *4.7 GB*.
- The single-sided, double-layer disc is capable of holding between *8.5-8.7 GB*.
- The double-sided, single-layer disc is capable of holding *9.4 GB*.
- Although rare, the double-sided, double-layer disc is capable of holding up to *17.08 GB*.

What is the difference between a DVD and a CD?

Physically, a DVD and CD look the same. Both discs are the same size and have a labeled and unlabeled side where the data is read by a laser. However, as was mentioned in the intro, DVD technology allows that same-sized disc to hold a lot more information than a CD.

What DVD player should I get to play movies on my computer?

We recommend VLC, a free and open-source media player that works on Windows, macOS, and Linux. However, you can also use Windows Media Player on Windows computers to play most DVDs.

Can DVD drives read CDs?

Yes, all DVD drives are capable of reading both CDs and DVDs. If you have a DVD burner, it can also write on CD-Rs, CD-RWs, and writable DVDs.

Types

On the basis of applications, a DVD can be categorized in different ways as described below:

- **DVD-ROM:** It can only be used for reading and cannot be written.
- **DVD-R:** It can be used to record any type of data.
- **DVD-RW:** It can be read, written, erased and rewritten.

Advantages

- Large storage capacity, e.g. 4.7 to 9 Gb
- Excellent sound and picture quality, so best option to store videos and audios
- Relatively cheap as they are mass-produced
- Information can be stored on both sides of DVD unlike CD.

DVD-ROM

- Digital versatile disc-read only memory (DVD-ROM) is a read-only digital versatile disc (DVD) commonly used for storing large software applications. It is similar to a compact disk-read only memory (CD-ROM) but has a larger capacity. A DVD-ROM stores around 4.38 GB of data. A CD-ROM usually stores 650 MB of data.
- A DVD-ROM permanently stores data files which cannot be changed, written over or erased. A personal computer (PC) with a DVD-ROM or a DVD-RAM drive is designed to read a DVD-ROM disc. Generally a DVD-ROM disc is not equipped to be used with a DVD drive connected to a home theater system or television. But many DVD-ROM drives can generally read a DVD movie disc.
- A DVD-ROM is one of the various types of DVDs. A blank DVD is generally a DVD-R or DVD+R, which has a read-write format. The +R or -R references the format standards and is a rewritable or recordable DVD.
- Compared to a CD-ROM, a DVD-ROM has the same 5 inch diameter and 1.2 millimeter (mm) thickness. But because a DVD-ROM uses a shorter wavelength laser with tighter compacted pits, the disc capacity is increased. In fact, the smallest DVD-ROM can store approximately 7 times more data than a CD-ROM.
- This term is also known as digital video disc ROM.

Disadvantages of DVDs

- There is no single standard of **DVD**
- They can be easily damaged by breaking or scratching

DVD-RW

Stands for "Digital Versatile Disk Rewritable." A DVD-RW is like a DVD-R but can be erased and written to again. Like CD-RWs, DVD-RWs must be erased in order for new data to be added. DVD-RWs can hold 4.7GB of data and do not come in double-layered or double-sided versions like DVD-Rs do. Because of their large capacity and ability to be used mulitple times, DVD-RW discs are a great solution for frequent backups. To record data onto a DVD-RW disc, you'll need a DVD burner that supports the DVD-RW format.

DVD-R

Stands for "Digital Versatile Disc Recordable." A DVD-R looks the same as a regular DVD, but like a CD-R, it can be used to record data. Once a DVD-R has been "burned," or written to, it cannot be written to again. A basic single-sided, single-layer DVD-R disc can store 4.7GB of data. Double-layer discs can store 8.5GB, while double-sided DVD-Rs can store 9.4GB. DVD-R is the most common format of writable DVDs (compared to the DVD+R and DVD-RAM formats). Most DVD players and DVD-ROM drives can read DVD-R discs. That means you can use a DVD-R disc to back up several gigabytes of data on your computer or make your own video DVD. The Apple SuperDrive used in many Macintosh computers supports the DVD-R format.

Advantages of DVD:

1. Large storage capacity, e.g. 4.7 to 9 GB
2. Excellent sound and picture quality, so best option to store videos and audios
3. Relatively cheap as they are mass-produced
4. Information can be stored on both sides of DVD.

Blu-ray

Blu-ray is an optical disc format such as CD and DVD. It was developed for recording and playing back high-definition (HD) video and for storing large amounts of data. While a CD can hold 700 MB of data and a basic DVD can hold 4.7 GB of data, a single Blu-ray disc can hold up to 25 GB of data. Even a double sided, dual layer DVD (which are not common) can only hold 17 GB of data. Dual-layer Blu-ray discs will be able to store 50 GB of data. That is equivalent to 4 hours of HDTV.

Blu-ray discs can hold more information than other optical media because of the blue lasers the drives use. The laser is actually blue-violet, but "Blu-ray" rolls off the tounge a little easier than "Blu-violet-ray." The blue-violet laser has a shorter wavelength than the red lasers used for CDs and DVDs (405nm compared to 650nm). This allows the laser to focus on a smaller area, which makes it possible to cram significantly more data on a disc the same size as a CD or DVD. Proponents of the Blu-ray format say they expect Blu-ray devices to replace VCRs (thank goodness) and DVD recorders as more people make the transition to HDTV.

Definition: -

A Blu-ray disk (BD) is a high-capacity optical disk medium developed for recording, rewriting and playing back high definition video. It can store large amounts of data and was designed to supersede the DVD.

Blu-ray was jointly developed by a group of personal computer and consumer electronics companies called the Blu-ray Disc Association. Blu-ray disks support higher resolutions and more advanced video and audio formats compared to DVDs.

Applications:-

- High Definition Television Recording

- High Definition Video Distribution

- High Definition Camcorder Archiving

- Mass Data Storage

- Digital Asset Management and Professional Storage

High Definition Television Recording

High Definition broadcasting is vastly expanding in the U.S. and Asia. Consumers are increasingly making the switch to HDTV sets to enjoy the best possible television experience. The Blu-ray Disc format offers consumers the ability to record their High

Definition television broadcasts in their original quality for the first time, preserving the pure picture and audio level as offered by the broadcaster. As such it will become the next level in home entertainment, offering an unsurpased user experience. And since the Blu-ray Disc format incorporates the strongest copy protection algorithms of any format or proposal to date, the format allows for recording of digital broadcasts while meeting the content protection demands of the broadcast industry.

High Definition Video Distribution

Due to its enormous data capacity of 25 to 50 GB per (single-sided) disc, the Blu-ray Disc format can store High Definition video in the highest possible quality. Because of the huge capacity of the disc, there is no need to compromise on picture quality. Depending on the encoding method, there is room for more than seven hours of the highest HD-quality video. There is even room for additional content such as special features and other bonus material to accompany the High Definition movie. Furthermore, the Blu-ray Disc movie format greatly expands on traditional DVD capabilities, by incorporating many new interactive features allowing content providers to offer an even more incredible experience to consumers. An Internet connection may even be used to unlock additional material that is stored on the disc, as there is enough room on the disc to include premium material as well.

High Definition Camcorder Archiving

As the market penetration of High Definition TV sets continues to grow, so does the demand of consumers to create their own HD recordings. With the advent of the first HD camcorders, consumers can now for the first time record their own home movies in a quality level unlike any before. As these camcorders are tape-based, consumers cannot benefit from the convenience and direct access features they are used to from DVD players and recorders. Now, the Blu-ray Disc format, with its unprecedented storage capacity, allows for the HD video recorded with an HD camcorder to be converted and recorded on a Blu-ray Disc. When the HD content is stored on a Blu-ray Disc, it can be randomly accessed in a way comparable to DVD. Furthermore, the disc can be safely stored for many years, without the risk of tape wear.

Mass Data Storage

In its day, CD-R/RW meant a huge increase in storage capacity compared to traditional storage media with its 650 MB. Then DVD surpassed this amount by offering 4.7 to 8.5 GB of storage, an impressive 5-10 x increase. Now consumers demand an even bigger storage capacity. The growing number of broadband connections allowing consumers to download vast amounts of data, as well as the ever increasing audio, video and photo capabilities of personal computers have led to yet another level in data storage requirements. In addition, commercial storage requirements are growing exponentially due to the proliferation of e-mail and the

migration to paperless processes. The Blu-ray Disc format again offers 5-10 x as much capacity as traditional DVD resulting in 25 to 50 GB of data to be stored on a single rewritable or recordable disc. As Blu-ray Disc uses the same form factor as CD and DVD, this allows for Blu-ray Disc drives that can still read and write to CD and DVD media as well.

Digital Asset Management and Professional Storage

Due to its high capacity, low cost per GB and extremely versatile ways of transferring data from one device to another (because of Blu-ray Disc's extremely wide adoption across the industry), the format is optimized for Digital Asset Management and other professional applications that require vast amounts of storage space. Think of medical archives that may contain numerous diagnostic scans in the highest resolution, or catalogs of audiovisual assets that need to be instantly retrieved in a random manner, without the need to "restore" data from a storage carrier. One Blu-ray Disc may replace many backup tapes, CDs, DVDs or other less common or proprietary storage media. And contrary to network solutions, the discs can be physically stored in a different location for backup and safekeeping.

Advantages of Blu-ray Discs:

1. Increased disc capacity for HD video up to 1080p resolution.
2. 7.1 channels of uncompressed audio.
3. Network/internet connectivity.
4. Higher capacity for storing and transferring amounts of data.
5. Faster playback and burning speeds.
6. Improved disc coating with increased resistance to scratches and smudges.

Disadvantages of Blu-ray Discs:

1. Cost
2. Hardware Requirements
3. Durability
4. Firmware Updates
5. Capacity
6. Digital Rights Management limits availability