



**Мавзу. Тиббиётда
мультимедиа иловаларини
яратишдаги дастурий
воситалар.**

Худайбердиева Х.Ў

1. Media & Multimedia nima?

- * **Media bu - nima?** Media bu insonlar o'rtasida axborot, bilim, xis-tuyg'ular, fikr-g'oyalarni yetkazib berish degan ma'no tushuniladi.
- * Medianing Etimologiyasi: **Suhbatdoshga bilim yoki axborotni berib baxam ko'rish** degan ma'no.
- * **An'anaviy Media -> Kompyuter va Digital Aloqa Texnologiyalari medianing muhim vositalariga kirishi**



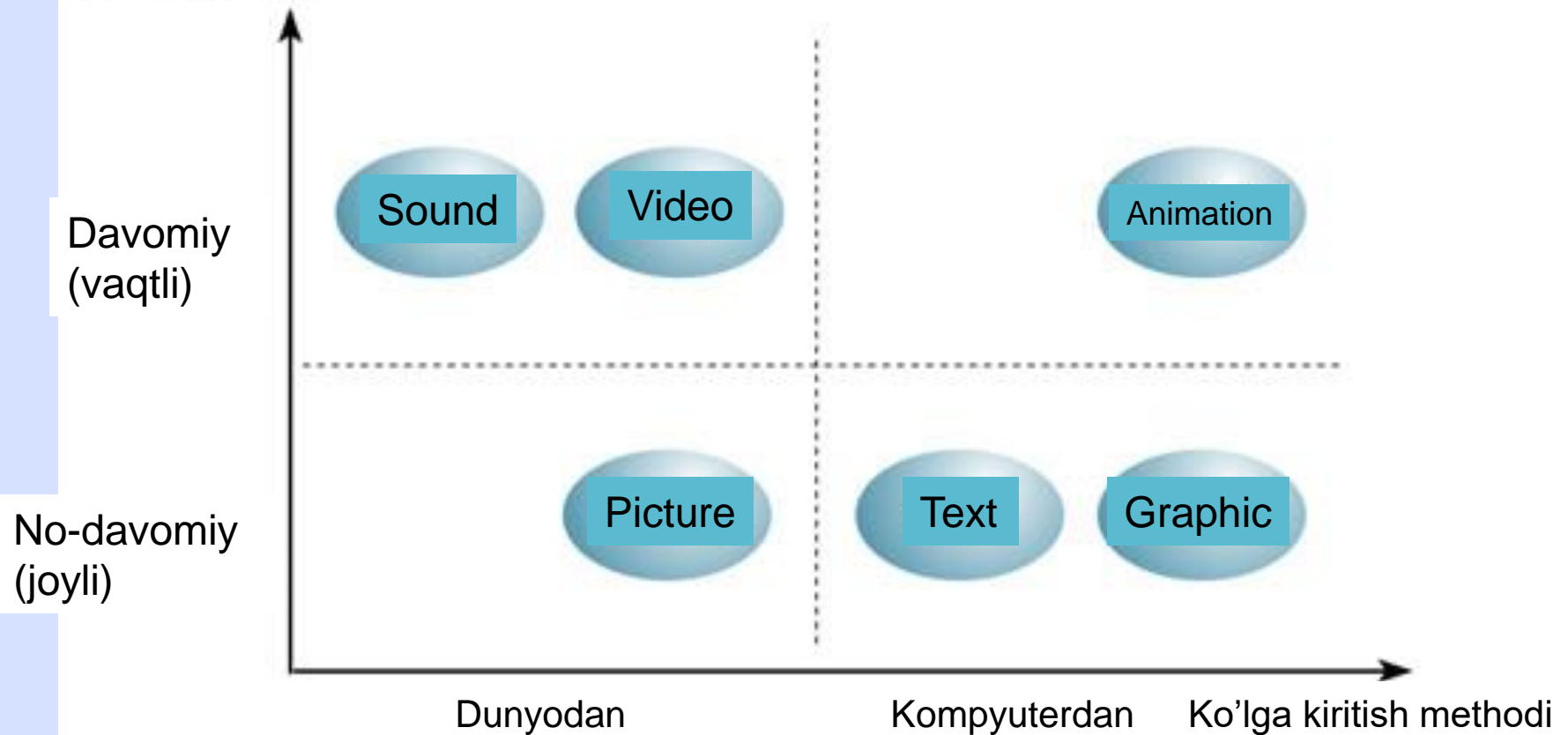
Multimedia - nima ?

- * Bir xil turli ma'lumotni mono-media deb atashadi.
- * **Multiple (ko'p) + media -> multimedia**
- * Multimedyaning komponentlari- Matn, image, ovoz, musiqa(to'xtatib ko'riladigan video), animatsiya, video(davomiy ko'riladigan video)

<i>Hello World!</i>					
Matn	Musiqa	Image	Grafik	Animatsiya	Video

Multimedia Xususiyatlari / Ko'lga kiritish Methodi

시간적(공간적)특성



Strukturalashgan multimedia : CD-ROM Tile, Web Page (HTML document)



Ayrim Izohlar

- * "Multimedia - kompyuterdan topshiradigan har qanday matn, san'at grafikolari, ovoz, animatsiya, va videodning kombinatsiyasi" (Vaughan T, Multimedia - Making it work 1993)
- * "Multimedia – bu data, matn, turli imagelar va ovoz, digital ma'lumotlar muhitini ochiq joysiz birlashtiradigan vositadir." (Feldman T, Multimedia, 1994)

TV Multimedia-mi ?

* **TV bu Multimedia-mi ?**

- * Axborotni bir tomonlama uzatib berish -> 'Interaction' bo'lmaslik
- * Analog data

Multimedia is just a hypertext?

TV is multimedia?

What is multimedia?

Multimedia is the most exciting thing to happen to communication since television.



* **Multimedianting bajarilish shartlari**

- * Ko'p media axborotni bir vaqtning o'zida qo'shish
- * O'zaro suhbat shakli(ikki tomoni) -> Axborotni boshqarish imkoniyatlari
- * Kompyuterdan foydalanib ko'lga kiritish(possesion), saqlash, boshqarish, iboralar (representation)
- * Data digital shaklini ishlab chiqarish(creation), saqlash, boshqarish, iboralari

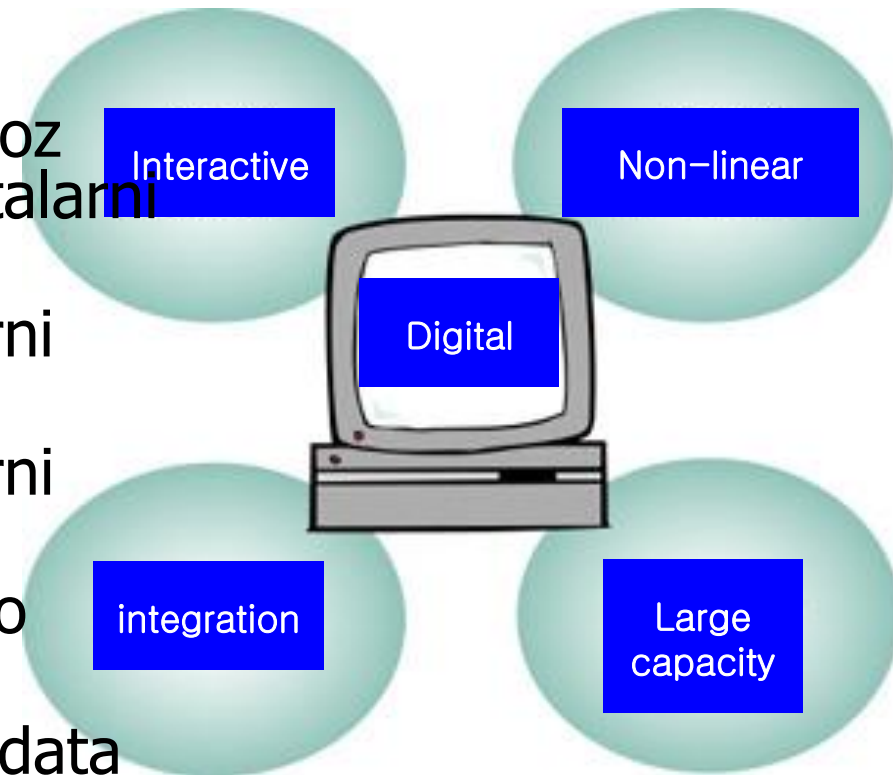


2. Digital Ma'lumot Xizmatlari(Merit)

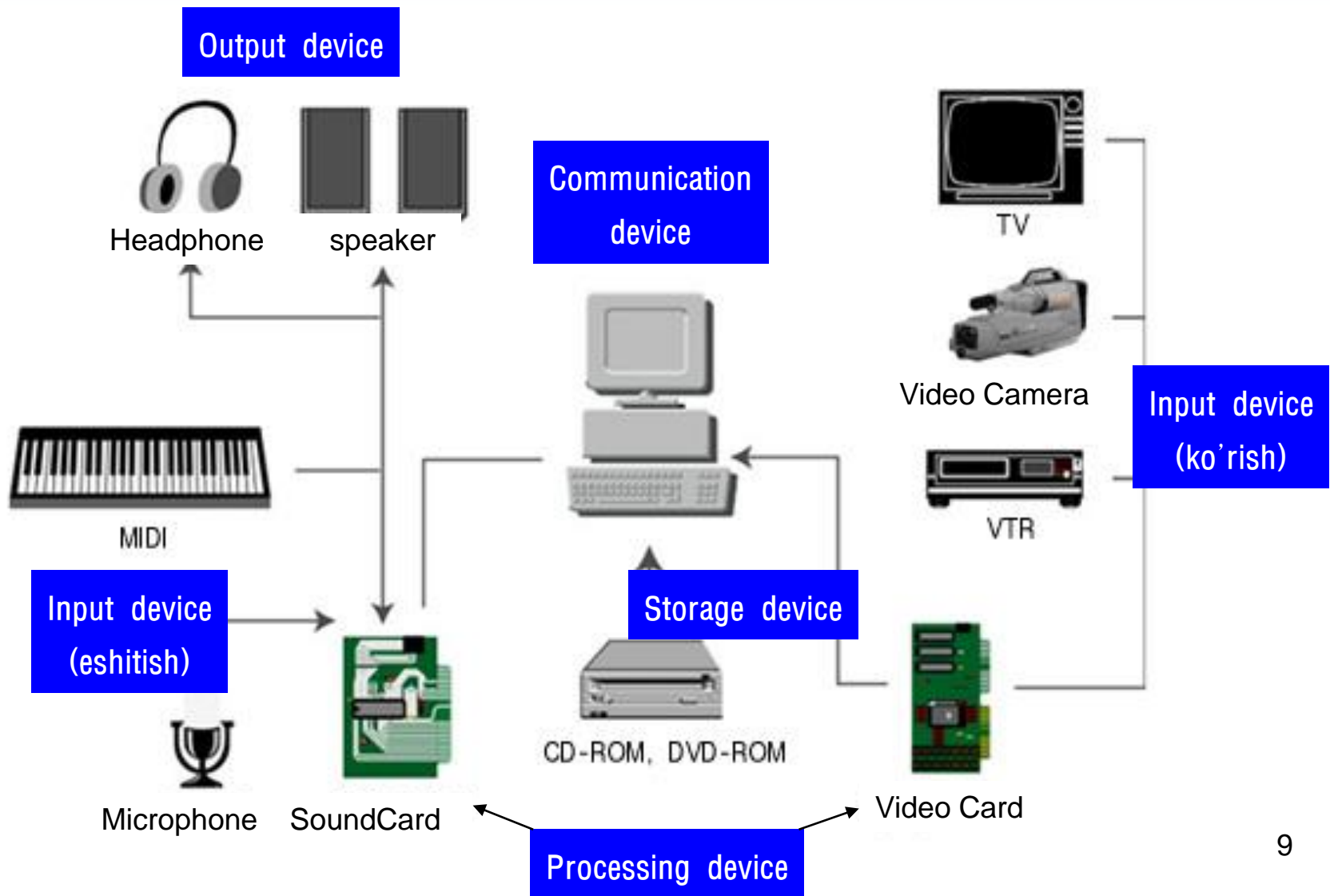
- * Jo'natish yoki print orqali ma'lumotlarni yomonlashishdan himoya qilish: Analog ma'lumotlar bilan solishtirganda shovqin(noise)ning yo'qolish osonligi
- * Ma'lumotni qayta ishlash, editing osonlashishi
- * O'zaro suhbat shaklining yaratilish imkoniyatlari
- * Ma'lumotlarni topish osonligi: Random access imkoniyatlari(mumkin)
- * Packet kommunikatsiya texnologiyalari orqali jo'natib olish (packet-small unit)
- * Katta hajmdagi ma'lumotlarni kichik hajmga aylantirib /uni o'z xoliga qaytarish imkoniyatlari (compression/decompression)

3. Multimedia Data Xususiyatlari

- * **Interactive:** O'zaro operatsiya, vaqt va joyni ko'rsatadigan cheksizlik (GUI, HCI kabilar)
- * **Non-linear:** Son, matnlar, ovoz yoki image kabi non-linear data larni boshqarish
- * **Integration:** Turli mediumlarni umumlashish(integration)
 - * Network orqali ma'lumotlarni birga egallash
- * **Large capacity:** Image, video kabilarni katta hajmdagi data
- * **Digital:** Analog datani digital data almashish



4. Multimedia H/W Komponentlari





Multimedia S/W

- * **O/S:** Mackintosh, Window(98, 2000, XP), Linux, Unix (X-Window)
- * **Muallif(authoring) SW:** Visual Basic, Director, Toolbook, Authorware, Icon-author, Flash
- * **Qayta foydalanish(replay) SW:** MP3 player, MPEG player, Real player, Quick time movie player, Windows Media player

Multimedia Komponentlarining Solishtirish

• **Matn:** datalar kattaligi (byte) = Xarf soni/1qator X qator son/1saxifa

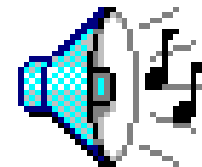
Ex) 80yozuv 40qator matn = 80xarf/qator X 40qator/saxifa =
3,200 byte = 3.2 Kbyte

*Hello
World!*

• **Digital audio:** data kattaligi (qiymati: byte) = sampling X sample kattaligi/8 X 1(mono) or 2(stereo) X davomiy vaqt

Ex) 60daqiqqa 44.1KHz, 16bit stereo sound

44,100 X 16/8 X 2 X 3600 = 635,040,000 byte = 635 Mbyte



Multimedia Komponentlarining Solishtirish

•**Image:** Data kattaligi (qiymati: byte)

$$= \text{Pixel soni} \times (\text{bit soni/pixel})/8$$

$$= x \text{ pixel soni} \times y \text{ pixel soni} \times (\text{byte soni/pixel})$$

Ex) 640 X 480 pixeldan tashkil topgan 24 bit rangli image

$$= 640 \times 480 \times 24/8 = 921,600 \text{ byte} = 921 \text{ KByte}$$



•**Video:** Dataning kattaligi (qiymati: byte)

$$= \text{image bitta programmaning kattaligi} \times (\text{frame/sekund})$$

Ex) 640 X 480 pixeldan tashkil topgan 24 byte rangli image

30frame/sekunddan 10sekund davomida aks etadi

$$= 921,600 \times 30 \times 10 = 276,480,000 \text{ byte} = 276 \text{ MByte}$$



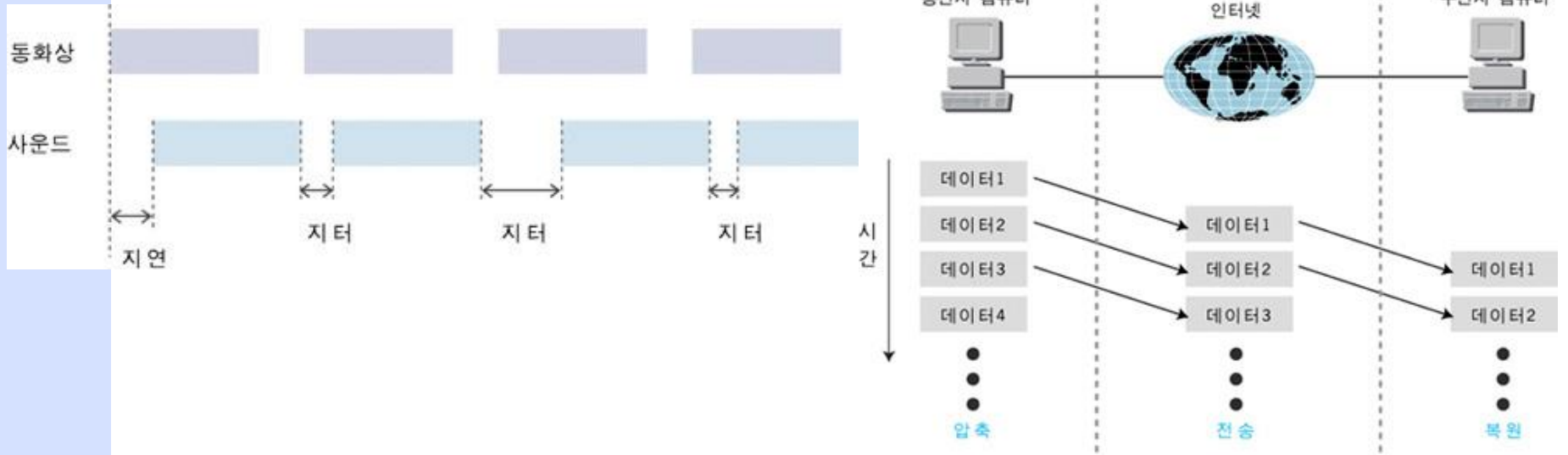


5. Multimedia Texnologiyasi

- * **Saqlovchi texnologiyalar:** CD-DA, CD-ROM, CD-I, Photo CD, Video CD, DVD(4.7G-8.5G/17G)
- * **Bosim(compression) qilish texnologiyalar:** JPEG, MPEG, DVI, AVI, Quick Time for Window, Video for Window
- * **Aloqa texnologiyalari:** Stream shaklida yuborish uchun high-speed technology(ADSL, ATM...)
- * **Sinxronlashgan texnologiya:** Vaqtni sinxronlashtirish, joyni sinxronlashtirish
- * **O'ylab ishlatish(application) va xizmat(service) texnologiyasi**

Reference: Streaming

* **Streaming** degan datani olgan zahoti output device da ko'rsatish orqali ma'lumotni olish vaqti qisqartirish texnologiyasi



Media	Eng katta mahalliy vaqt (sekund)	Eng katta chito vaqt(milli sekund)
Ovoz	0.25	10
Video (TV level)	0.25	10
Kompress video	0.25	1
Matn	1	-
Data(fayl o'tkazish)	1	14
Image	1	-



6. Multimedyaning Qo'llanishi(usage)

- * Ta'lim va Tarbiya
- * Kompyuter orqali olib boriladigan majlis (video conference)
- * Kiosk
- * Ko'ngil ochar o'yinlar (game)
- * Virtual reality
- * Internet orqali turli xizmatlar: e-biz, homepage, reklama...
- * boshqalar: turli CD-ROM, Presentation



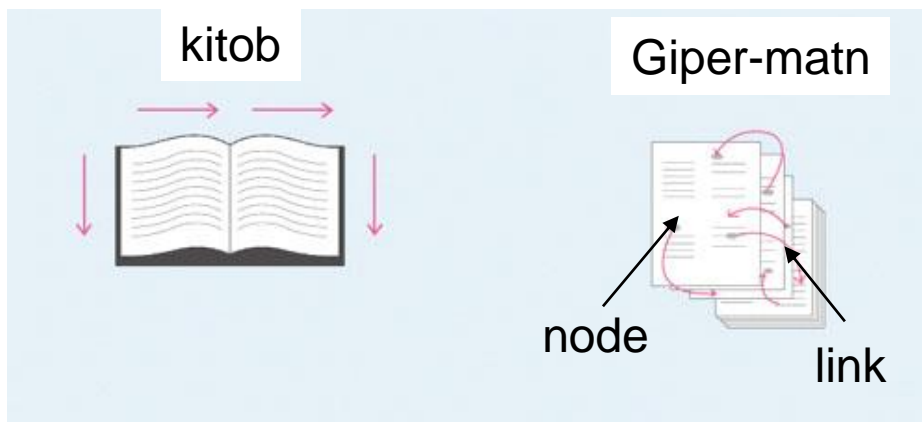
7. Multimedia Trend

- * Multimedia data yuborish tezligining tezlik oshishi: Eng yuqori tezlikdagi Informatsion Aloqalar (information super-high way), ATM Almashtirgich, Optik kabel
- * Kompyuter network orqali multimedia: Dataning birga egallanishi(sharing) tezligining oshishi
- * Giper Medianing rivojlanishi: Informatsiyalar ichida multimedia ma'lumotlarinig topadigan(searching) va yo'naltiradigan(navigation) texnologiyalarning rivojlanishi
- * Katta hajmni saqlash qurilmalarining(device) paydo bo'lishi
- * Hajmni kichiklashtirish va o'z holiga qaytarish texnologiyalarining rivojlanishi
- * Multimedia jamiyatida kompyuter, kommunikatsiya, radiouzatishlar, gazeta, kino, nashr kabi sanoatning o'zaro birikish (industry integration) tendensiyalarining kengayishi

8. GiperMatn & Gipermedia

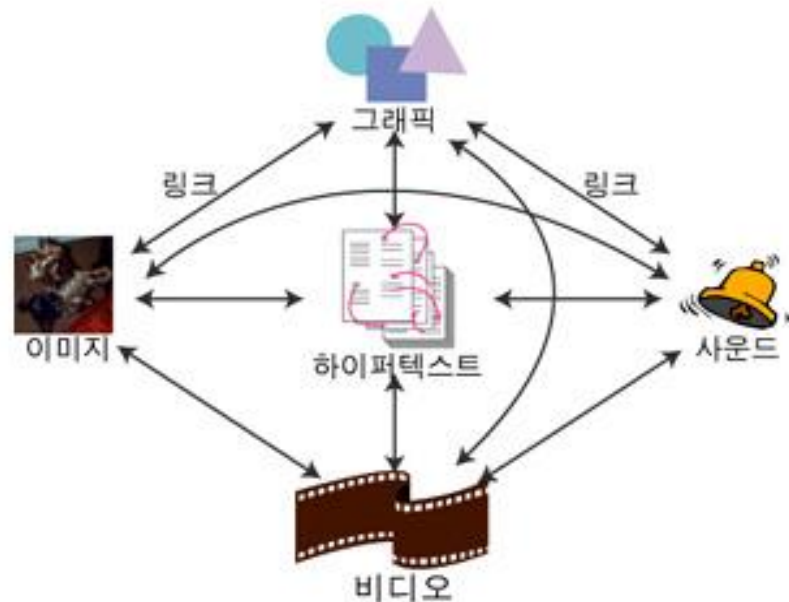
* GiperMatn

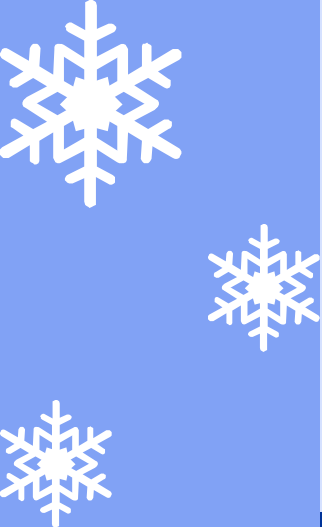
- * GiperMatn o'zaro assotsiatsiyasi bo'lgan Matn bo'lakni ketma-ket bo'lmagan(non-sequential) tarzda bog'laydigan tarkibdir
- * Node: Matn ma'lumotining nomi
- * Link: Node bilan bog'lovchi ko'rsatgich



Gipermedia

- * Turli media datalarini **Link orqali bog'lab** kerakli ma'lumotni izlay oladigan ma'lumot topuvchi tizimdir
- * Gipermatn tushunchasidan(concept-dan) kelib chiqqan
- * Node: graphic, animatsiya, video kabi multimedialar





Multimedia Tushunchasi

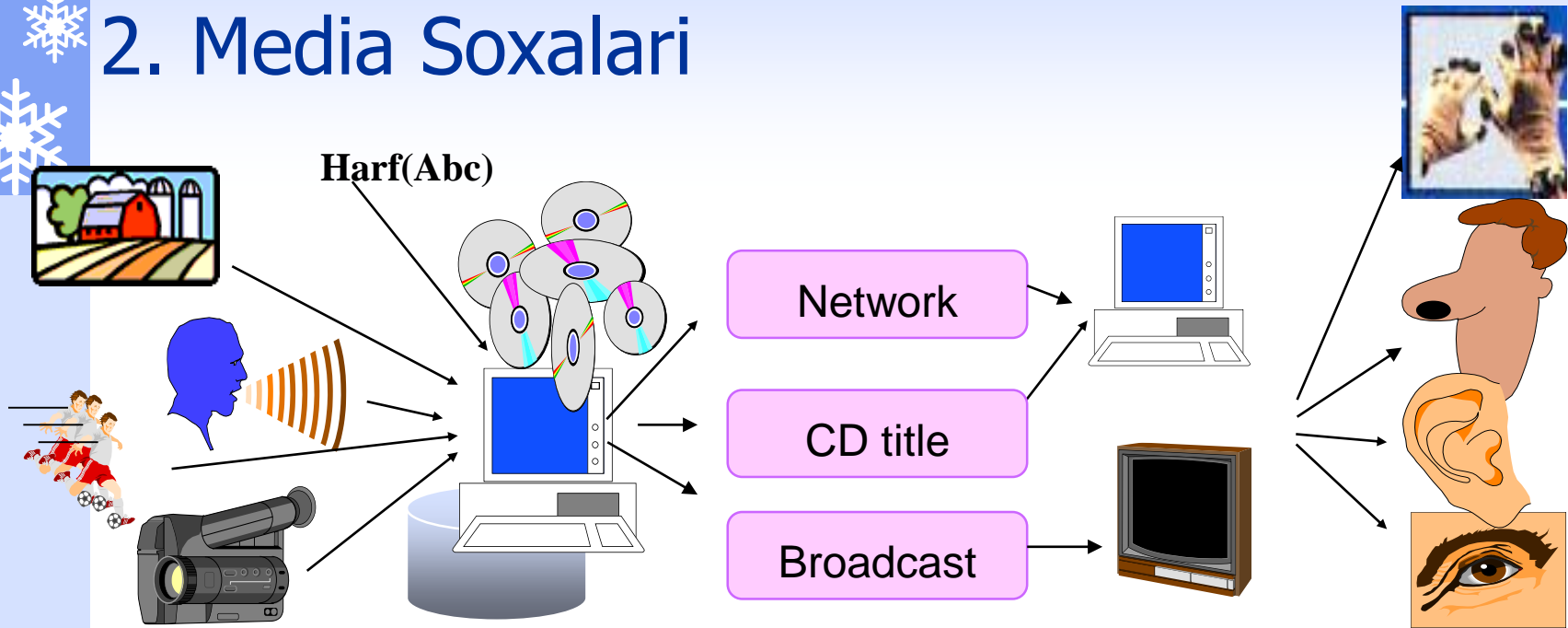


1. Multimedia Izohi

- * Multimedia: Text, Graphic, Image, Sound, Rasm kabi Mediani 2dan ortiq foydalanib yasash yoki Program qikib,
- * qaysi maqsadlarni o'zida saqlagan Content (Masalan: Game, reklama, yangiliklar, ta'lim kabi)larni yaratib,
- * ommaviy media(Masalan: Radio, TV) bilan birga aloqa vositalar (Internet, Tezkor Informatsion Aloqa Tizimlari)dan foydalanib,
- * boshqa odamga ifodalash qonuniyati va texnologiyasidir.

- * Multimedia: inson va insonlar o'rtasida matn, rasm, animation, sound kabi Media datalarini bitta ob'ektga birlashtirib, ma'lumotlarni ifodalash, saqlash, yetkazish(transformation) texnologiyasidir.

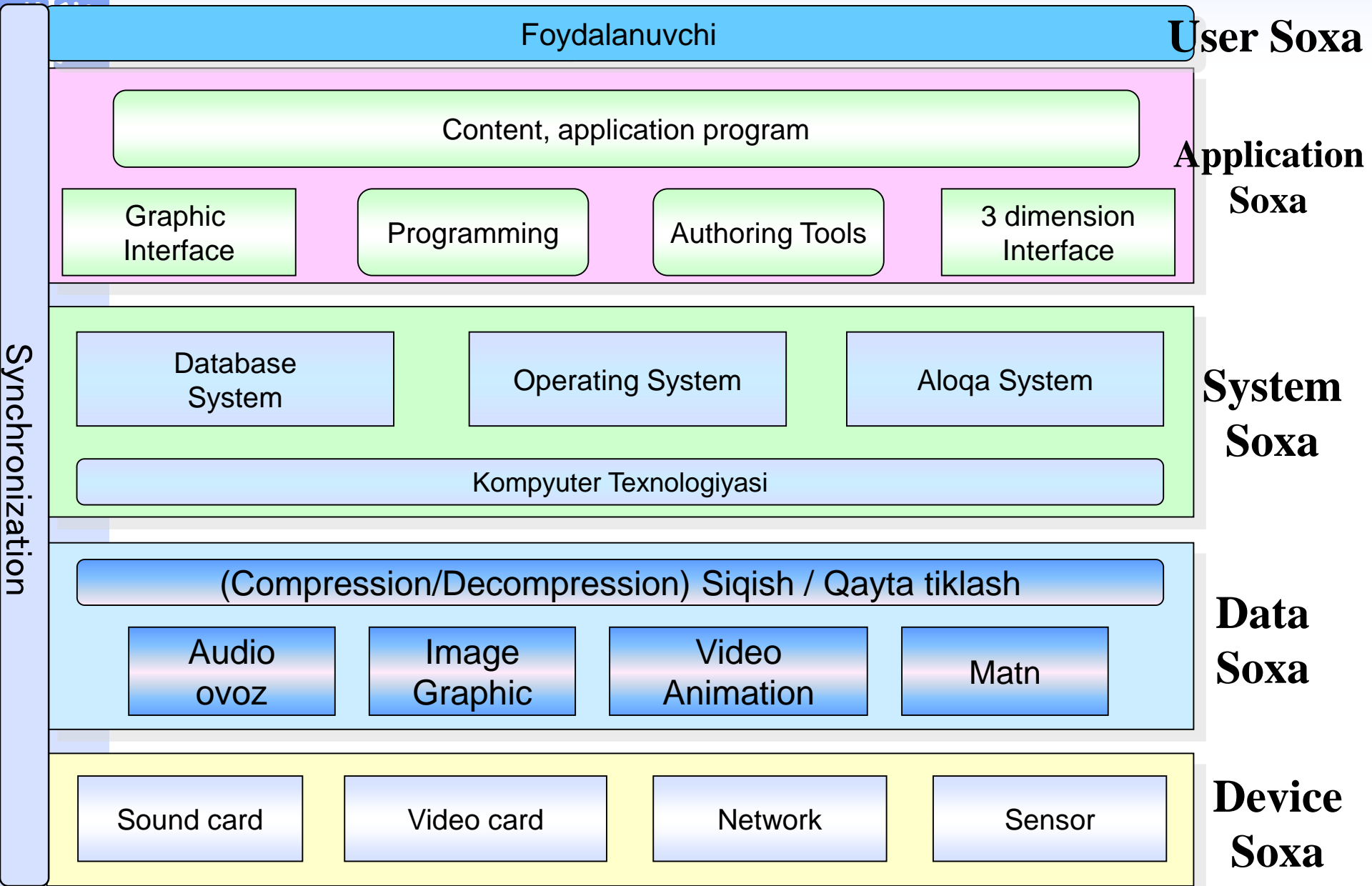
2. Media Soxalari



Representation Media	Storage Media	Communication Media	Presentation Media	Perception Media
----------------------	---------------	---------------------	--------------------	------------------

- * Representation Media(Vakolatli vositalar) : Matn, Rasm, Animation, Sound/ovoz, Harakatlanuvchi film
- * Storage Media(Saqlash vositalari) : CD-ROM, HDD, FDD..
- * Communication Media(Aloqa vositalari) : Computer Network, Broadcasting System
- * Presentation Media(Namoyish vositalari) : Computer Monitor, TV, Speaker
- * Perception Media(Hissiy vositalar) : Insonning 5 hix tuyg'usi

3. Multimedia Systemning Tuzilishi(Structure)





4. Device Soxa

- * Digital Audio va Videolarni boshqarish uchun eng asosiy soxasi - Digital Signal Processingdir(DSP).
- * Bu soxasi- har bir device(mashinka)-dan chiqadigan Signal Datalarni Computer Inputga olib beradi.
 - * **Data saqlash/qayta tiklash** uchun- Hard disk, CD-ROM, CD-DA(Compact Disk Digital Audio), CD-I(Compact Disk Interactive), DVD(Digital Versatile Disk) kabi saqlovchi qurilma(structure)lar bo'lganda
 - * **Aloqa Media** – networkni ishlatish (Network Card-Modem, Ethernet, ATM, ISDN...)
 - * **Multimedia Data input/output soxalari** uchun - Sound Card, MIDI qurilmasi, TV card, Video Card, Sensor kabilar.
- * Network- barcha Media shakllarini yubora oladigan real vaqtda

5. Data Soxa

Data soxasi- Device soxasidan boshlab yaratilgan elektrik Datalarni ko'rish va eshitish mumkin bo'lgan Datalarga aylantirib boshqaradigan soxa bo'ladi.

- * Multimedia Datalarini saqlash va uzatish uchun-siquvchi(compression) Algorismdan foydalanadi.
- * Audio Digitallashtirish va siquvchi: PCM (Pulse Code Modulation) method va ADPCM (Adaptive Differential Pulse Code Modulation) methodi bo'ladi.
 - * PCM methodi- **Data miqdori ko'p** bo'ladi lekin **sifat yaxshi** bo'lgani sababli **musiqa CDdan** ko'p foydalaniladi.
- * **Image va Graphic siqish:** JPEG(Joint Photographic Expert Group- ko'p foydalanadi), BMP(Bitmap), PCX(Picture), TGA(Targa) kabilar.



Data Soxa (Davomi)

- * **Video(davomiy grafik) siqish:** real vaqtda siqish va real vaqt bo'lmaganda (real time and non-real time) siqishga qarab bajarish har xildir.
- * **Real vaqt bo'lmagandagi siqish qayta tiklashda** MPEG (Moving Picture Experts Group) bo'lib CD-ROM, CD-I kabilardan ko'plab foydalanish mumkin. DivX(MPEG4dan rivojlangan)
- * real vaqt media compress/decompression texnologiyasi: Masalan, Virtual majlis - medialarni **yaratilishi bilan uni uzatish** va o'zining **asl(original) holiga qaytarish** uchun.
- * Inputni olgan zahoti image Analog Signal Digitallashtirilgan Computer Network orqali uzatish/ olish joyi tomonidan Datalarni olgan zahoti uni o'zining asl holiga qaytaradi.
- * compression standartlashgan vakillaridan biri **H.261dir.**



6. System Soxa

- * **Data soxasi va System soxasinig** aloqasi kompyuter texnologiyalarida bir-biriga bog'liq holda aloqada bo'ladi.
- * Datalarning faoliyati(activity) uchun **turli System Servislari talab qilinish**
- * asosida
 - * O/S (Operating System),
 - * Database,
 - * Kompyuter aloqalari system.



7. Application Soxa

- * Multimedia Datalarini boshqarish uchun **har bir tool program** (Audio, Video, Graphic, Authoring Tools kabi)lar
- * Programmallashtirish tillari uchun bo'lgan **Compiler kabilar**
- * Multimedia yaratib qo'llab quvvatlash toollari va
 - * virtual majlis,
 - * keng tarqalgan ta'lim, (distance-learning)
 - * keng tarqalgan Presentation shu bilan birga ²⁷ birlashtirish jarayonlari



8. Synchronization

- * Multimedia Datalari o'zaro temporal (vaqtinchalik), spatial(kengaytirilgan) aloqalarini o'zida saqlagan bo'ladi.
 - * Vaqtinchalik aloqalar **boshidan oxrigacha aloqa** asosida bo'lsa,(oldingi-keyingi aloqa)
 - * kengaytirilgan aloqalar **bir vaqtning** o'zini ma'nosini beradi.
 - * Misol) gapirganda ovoz va og'iz shakliga mos ravishda tabiiylikni saqlab qoladi.
- * sinxronizatsiya - **Multimedia Datalarini birlashtirish jarayonlarida eng kerakli bo'limlardan biridir**



9. Multimedia Application Soxa

- * Multimedia Application soxasida kerak bo'lgan narsaga qarab **turlicha foydalanish** mumkin.
- * Ayniqsa hozirgi vaqtda multimedia Information Aloqalar Texnologiyalari rivojlanayotgan va shu bilan birgalikda **turli applicationlar** amalga oshirilib kelinmoqda.
- * Application soxasida(Computer H/W davomli rivojlanadi -> **Odam hohlaydi**)
 - * Nashriyot, muloqot(communication), home-appliances(uyda ishlatilgan kompyuter soxalari)



9.1. Multimedia Title

- * Katta miqdori datalarni saqlab, Contentlarni qo'yish orqali CD-title shakllari
 - * Kiosk (Firmani tanishtirish)
 - * Edutainment (Ta'lim- Game)
 - * Entertainment (Game)
 - * Advertisement (Reklama)
 - * Simulation (Virtual mashg'ulot)
 - * Elektron Gazeta / Jurnal kabilarning nashri
 - * Katta hajmdagi ma'lumotlar title



9.2. O'zaro Aloqa Multimediasi

- * Computer Networklaridan foydalanilganda Multimedia amal qilish soxalari:
 - * Video Conference (Virtual majlis)
 - * Multimedia Groupware
 - * Distance Education
 - * VOD (Video On Demand)
 - * Distance Medical Service
 - * Interactive TV
 - * CSCW(Computer Supported Cooperative Work)
 - * Internet, O'z uyida ishlash
 - * Personal hand phone



9.3. Xo'jalik(family) Soxasida

- * Oilada ishlatiladigan texnologiyalar
 - * Video Phone
 - * O'yin o'ynash texnologiyalari
 - * HDTV
 - * Set Top Box
 - * Sound video orqali foydalanishni tushuntirish kabi (guidance)

9.4. 'Multimedia'ning Rivojlanish Yo'nalishi

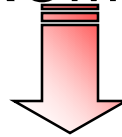
Package Type Multimedia

CD-ROM, DVD



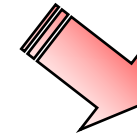
Network Type
Multimedia

Internet, Mobile
VOD, Groupware



Maxsus maqsadlardagi
Multimedia

Harbiy maqsadlar,
Business soxasidagi
bilimlar



Xo'jalik soxasidagi
Multimedia

Home Automation..
Game, HDTV..
Video phone..



Multimedia

Insoniyat ilgari zamonlardan boshlab o'z o'ylaganini boshqa odamga yetkazib berishda matndan foydalanishni boshladi.

Kompyuterning rivojlanishi bilan Keyboard orqali input qilib, foydalanish imkoniyatlari paydo bo'lib, halqaro standartlardagi ISO tashkilotini tuzib barcha davlatlarda keng foydalanishga imkon yaratdi.

Text(Matn)



1. Text Asosi

- * Multimedia datasi ichida biz **eng osonlik bilan foydalanadiganimiz bu - Text**
- * Kompyuterning Text datasining kiritilishi - Keyboard, Scannerdan foydalanadi
- * Xususiyati
 - * Boshqa multimedia datalariga qaraganda **kichik hajmli data**
 - * Foydalanadigan **tiliga qarab boshqa xususiyatlarga** ega bo'ladi
 - * Foydalanuvchi yozishda **foydalangan tilni**



2. Text Ifodalanishi

* 4.2.1 Text Code

- * Barcha harflar ikki qonuniyatlaridan(binary) foydalanadigan kodlarni ifodalaydi
 - * alphabet-dan foydalanish: Umuman 8 bit koddan foydalanadi
 - * sharq davlatlari(Korea, Japan, China): 16 bitli koddan foydalanish



2.1 Text Code(ASCII Code)

- Dunyodagi eng keng tarzda foydalaniladigan Code ASCII Code bo'ladi
 - 8 bit - 256 ta harfni ifodalash imkoniyati
- Nemis tili, Fransuz tili, Ingliz tili
 - 7 bitdan foydalanib 128 ta harfni ifodalaydi
 - Eng yuqoridagi bit errorlarni tekshirish maqsadida foydalaniladi
- Boshqa alphabet-dan foydalanuvchi tillar:
 - 8 bit hammasidan foydalanish
 - maxsus harflar yoki belgilarni ifodalash
- IBM kengaytirilgan ASCII (extension-ASCII)
 - Boshlanishi 128 ANSI kodi ASCII kodi bilan o'xshash
 - qolgan 128-tasi Windows amalga oshiruvchi(application) programmasi uchun aniqlab



Text Code(EBCDIC Code)

- EBCDIC kod **IBM firmasi middle-range (o'rtacha hajmdagi) kompyuterlarni IBM360/370/390 sistemasidan foydalanish uchun rivojlangan kodlardan tuzilgan**
 - 8 bit bilan chiqara oladigan 256 ta kodning hammasidan foydalanmasdan taxminan 150 ta koddagina foydalanish



Text Code(Unicode)

- Kompyuter va Internetning ommaviylashishi butun dunyoda ommaviy tarzda qo'llana oladigan kodlarning tuzilishi zaruriyatini yaratdi
 - Buning uchun **ISOda barcha tillarni ifoda eta oladigan UNICODE yaratilib**, bu kodlar davlat standartlariga mos ravishda butun dunyoga keng tarqaldi
- Butun dunyoga ma'lum bo'lgan barcha harflarni o'z ichiga olib 8 bit miqdorli Octet bilan ifodalanadi – **2³⁰ Octet/16bit**



2.2 Font

- Font: **harf shakli**ni ifodalash uchun
 - Uning asl ma'nosi: Shakl va hajmini ko'rsatish uchun
- **Font hajmi -> Point** degan miqdor bilan ko'rsatiladi
 - Harf kattalik standartlaridan foydalanib 72ta point 1 inchlignini ko'rsatadi(72 point = 1 inch)
- Font asosiy xususiyati: Harf **ingichkaligi**, harf **rangi**, harf **soyasi**
- Harflar o'rtasidagi **masofani**(space) boshqarish: kengayishi (**scale**) yoki harflar o'rtasi opa (s p a c i n g)
- Lotin grafikasi bo'lgan holatda
 - O'rnatilgan masofa Font(Fixed-Font) va Proportional Fontlardan foydalanib / Fixed va proportional
 - **ko'pchilik Fontlar proporstional** bo'lib
 - vakili o'rnatilgan masofa Font(Fixed-Font): **System font, Courier font**lar mavjud



Font (Bitmap Font va Vector Font)

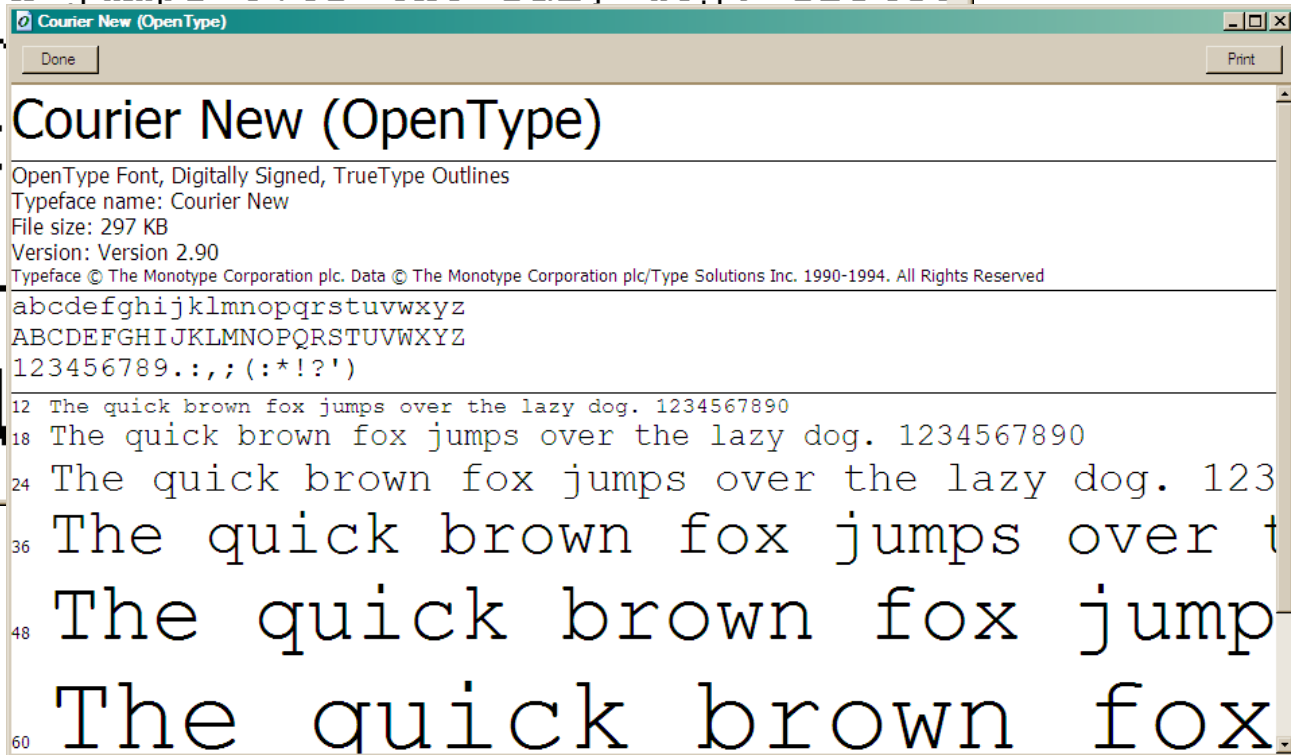
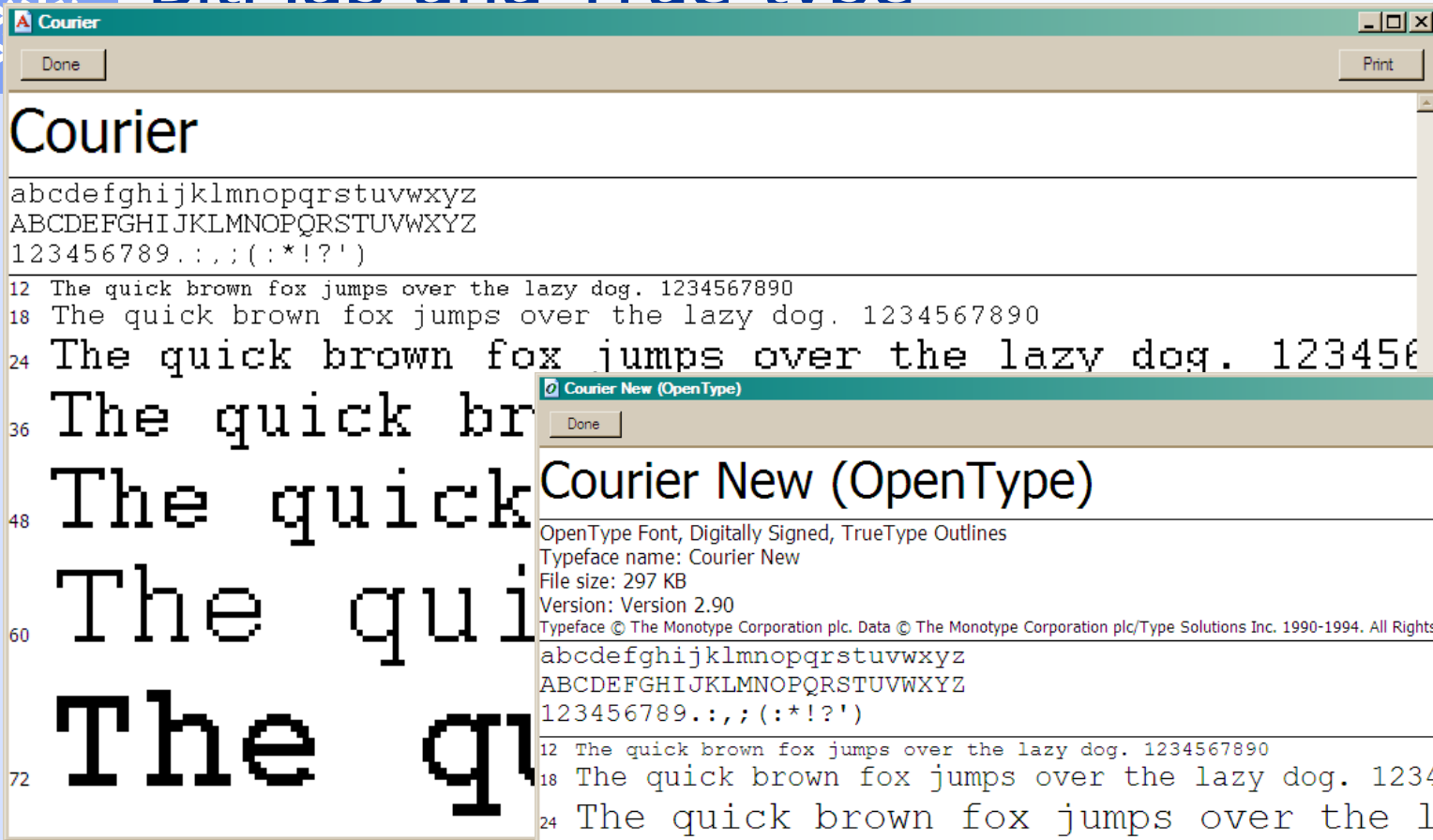
BitMap Font holatida ko'p nuqdalarni yig'ib bitta harf qilish

- Kattaligiga qarab umumiy memory(saqlash) hajmi oshishi mumkin
- Maxsus bo'lgan kattalik ma'lum harfni ko'rsata oladigan holatda aliasing ko'rinishini paydo qila olishi mumkin (ex, 25point- yok paytda)

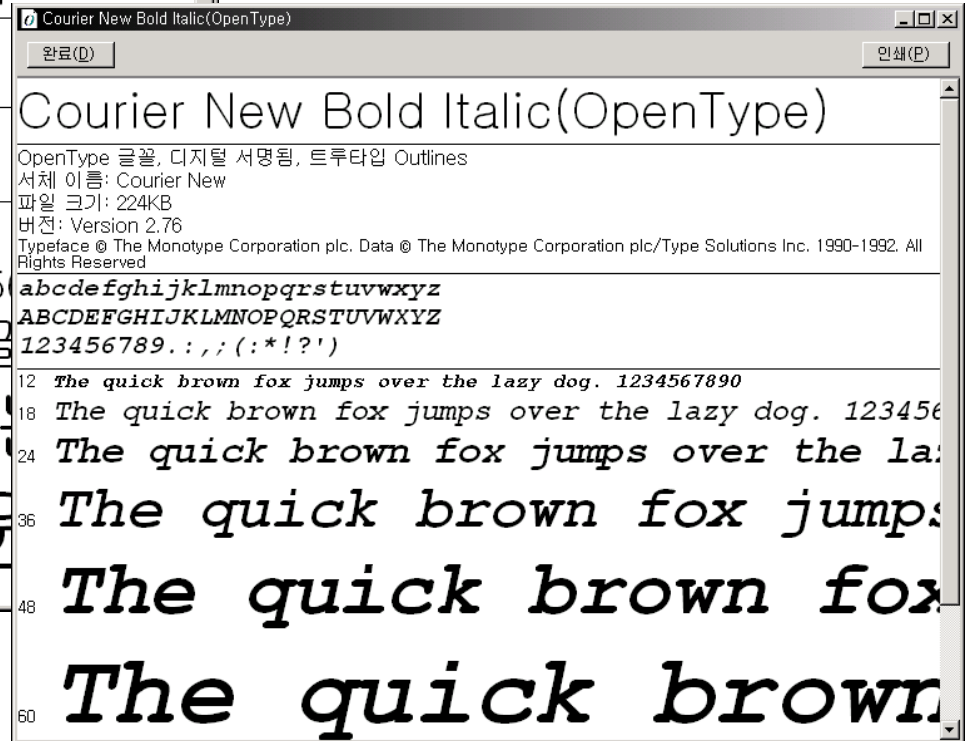
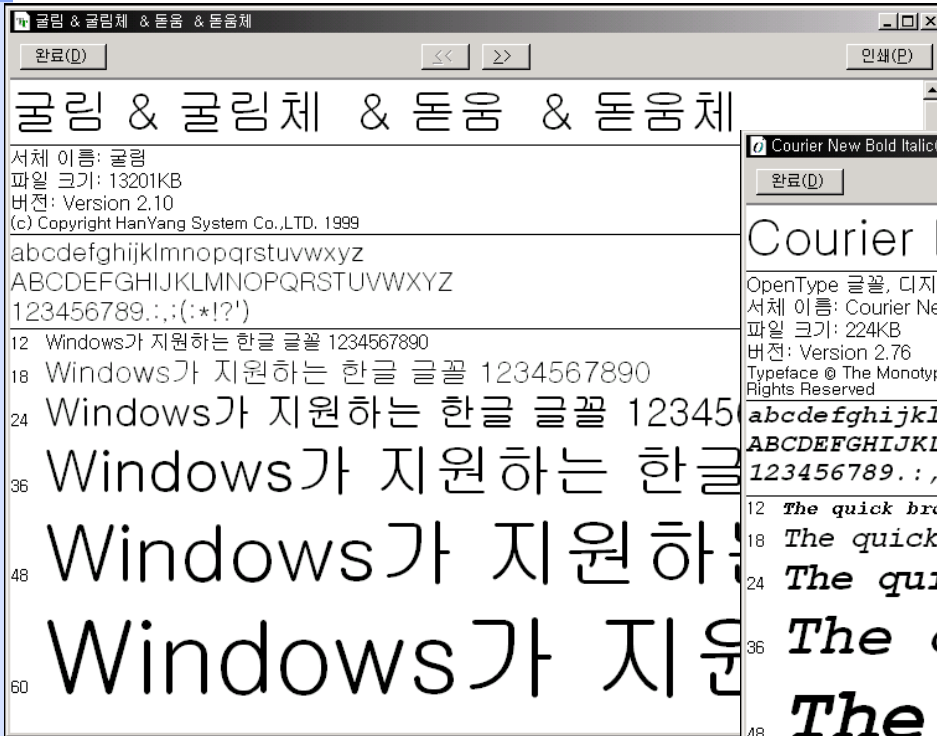
Aliasing

- **Vector Font** (True type Font): Harf ko'rinish kontur chiziqlarini matematik funksiya bilan ifodalash
 - Egri bo'lmasdan to'g'ri ifodalash
 - Harfning kattaligini o'zgartirgan holatda – funksiya parametrlarini o'zgartiradi
 - Printer pixellari dpi bilan ifodalanadi. Monitor ekrani kattaligi pixellar bilan ifodalanganligi sababli chiquvchi(output) vektor Font yaxshi
- ❖ Vector Font(True-type Font): Harflarni erkinlik bilan kengaytiradi, kichraytiradi, shaklini o'zgartirganda, egri bo'lmadigan Fontga aytiladi

BitMap and True-type



Font (Davomi)



Windows umuman foydalanadigan

(a) Hangil(Koreys) Font va (b) Lotin Fontlaridan iborat



3 Text File Shakli

* Text Ma'lumoti

- * Lotin grafikasi bo'lgan holatda ASCII kodi,
- * Hangil(koreys) grafikasi bo'lgan holatda KS5601 kodidan foydalanadi
- * Uzbekcha grafikasi bo'lgan holatda qaysi kodidan foydalanadi?
 - * UniCode bilan!
- * File *.txt deb ataladigan kengaytmadan(extension-dan) foydalanib saqlaydi

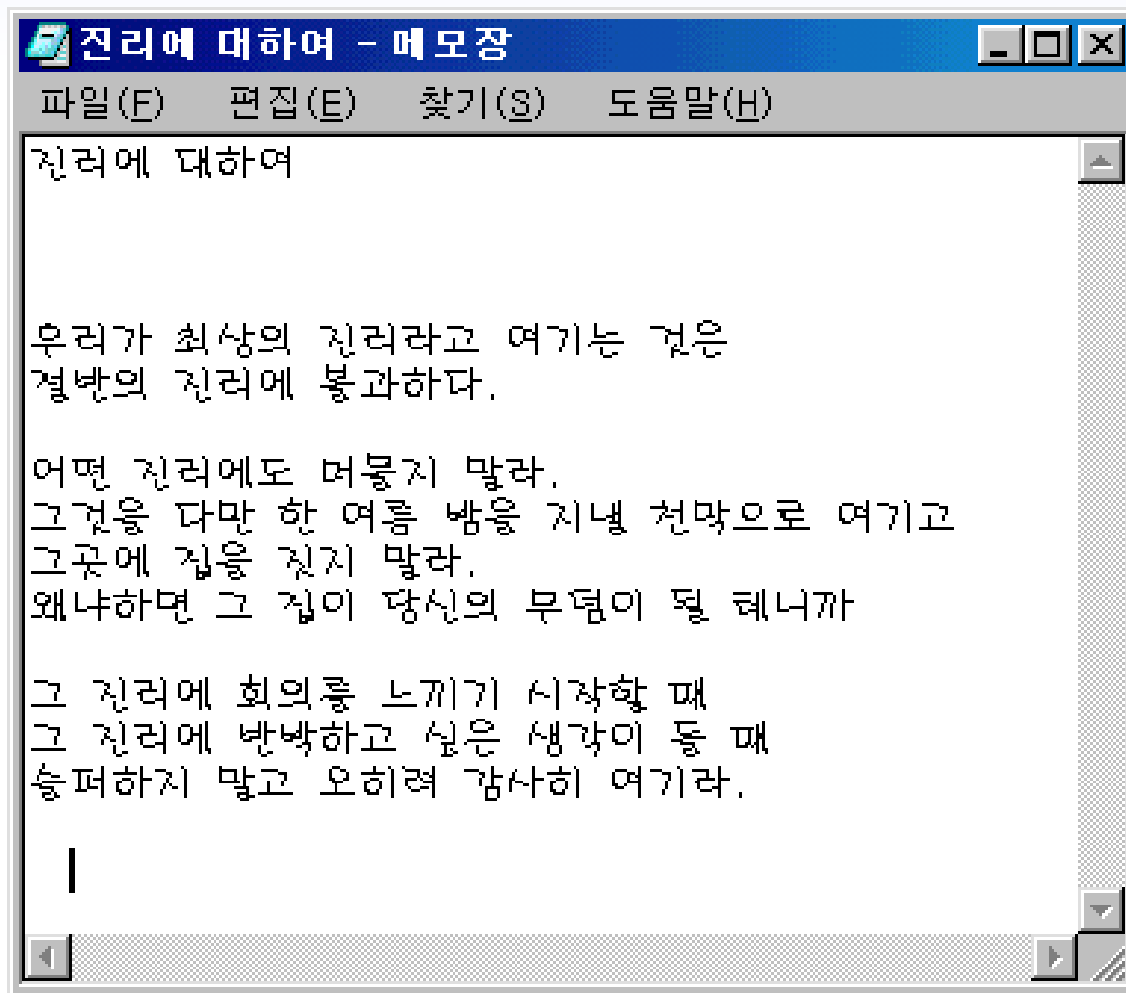


3.1 TXT

- * TXT Format File – Oddiy harf kodlarini birlashtirib tuzadi
 - * Maxsus harflarni(special character) ifodalash uchun Font ibora ma'lumotlari va paragrah qator qiliah kabilarni Word processorga kerak bo'lgan ma'lumotlarni o'zi bilan olib yurmaydi.
 - * **original materiallarga ega bo'ladi**
- * O/S asosida yetkazib bergan **Text editordan** foydalanib yaratiladigan File shakli (musol: notepad⁴⁵)



TXT (Davomi)





3.2 DOC(Document)

- * **MicroSoft Worddan** foydalanib tuzilgan xujjat Format
- * Grafik samaradorligi(effect), rasm va maxsus belgilar, yozma ko'rinishda shakl ma'lumoti, tab, qatorlar orasidagi joy kabi wordda kerak bo'ladigan barcha ma'lumotlarni o'z ichiga oladi
- * Bir xil *.doc deb ataladigan kengaytirishdan foydalansa ham yuqori



3.4 RTF

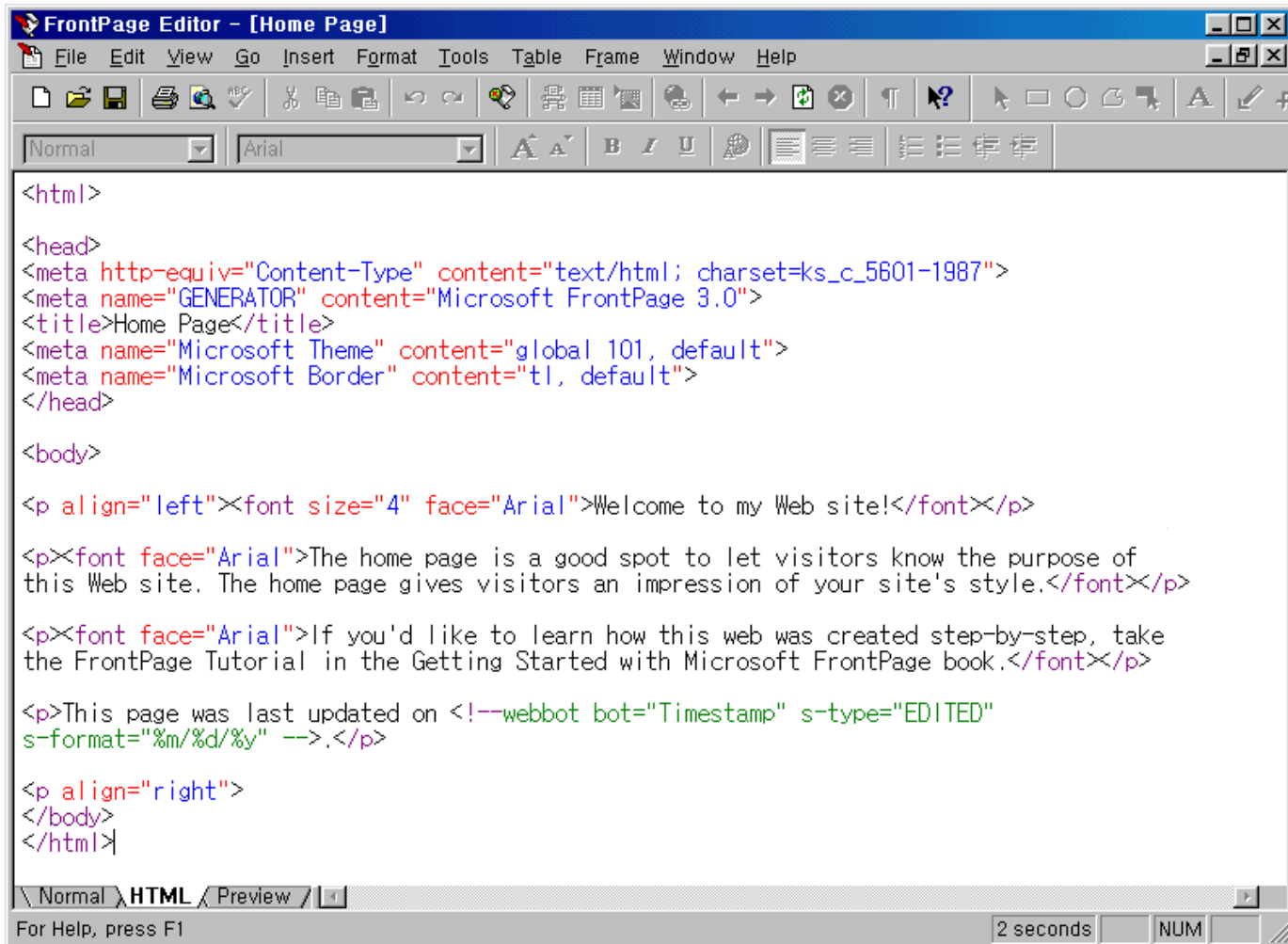
- * RTF o'zaro boshqa OS va o'zaro boshqa Word Processor orasida ham Text Faylni berib-olishda foydalanadigan xujjat shakli
- * **Xujjat strukturasi** aloqada bo'lgan ma'lumotlarni ekranda o'qiy oladigan Text bilan ko'rsatiladi
- * Jadval yoki tenglashtirish(equation) kabi **murakkab funksiyalardan foydalanmagan holatda** word processor o'rasidagi xujjatlarni o'zgartira oladigan metod
- * File kattaligi word processor Fayli bilan solishtirsak **bir necha marta katta**
- * **Boshqarishga ko'p vaqt ketib**(processing time) faqat o'zaro boshqa word processor o'rtasida almashtirgan paytda ichlashtirish yaxshi



3.5 HTML

- * Oddiy TXT shaklida bo'lib, oddiy TXTga muharrirlik(edit) qila oladigan editor bo'lca, bajarish mumkin.
- * **Internet web xujjat standard.**
- * Oddiy Text File shakli ko'rinishiga mos bo'lmaydi -> Web Browser o'rkali ko'rish kerak.
 - * Tag bilan birga ko'rinadi

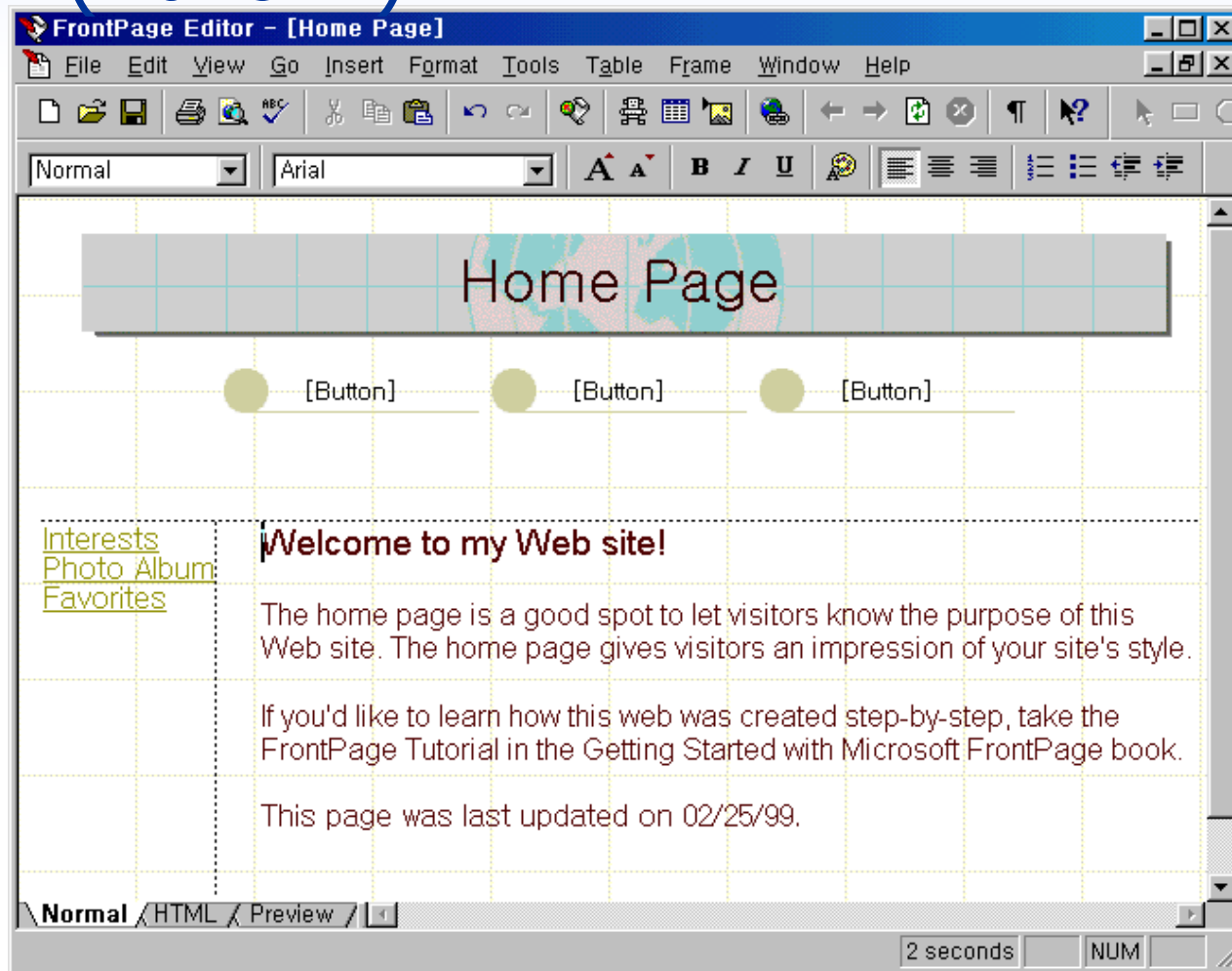
HTML (Davomi)



The screenshot shows the Microsoft FrontPage Editor interface. The title bar reads "FrontPage Editor - [Home Page]". The menu bar includes "File", "Edit", "View", "Go", "Insert", "Format", "Tools", "Table", "Frame", "Window", and "Help". The toolbar contains various icons for file operations, editing, and formatting. The status bar at the bottom shows "Normal", "HTML", "Preview", and "2 seconds".

```
<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=ks_c_5601-1987">
<meta name="GENERATOR" content="Microsoft FrontPage 3.0">
<title>Home Page</title>
<meta name="Microsoft Theme" content="global 101, default">
<meta name="Microsoft Border" content="tl, default">
</head>
<body>
<p align="left"><font size="4" face="Arial">Welcome to my Web site!</font></p>
<p><font face="Arial">The home page is a good spot to let visitors know the purpose of
this Web site. The home page gives visitors an impression of your site's style.</font></p>
<p><font face="Arial">If you'd like to learn how this web was created step-by-step, take
the FrontPage Tutorial in the Getting Started with Microsoft FrontPage book.</font></p>
<p>This page was last updated on <!--webbot bot="Timestamp" s-type="EDITED"
s-format="%m/%d/%y" -->.</p>
<p align="right">
</body>
</html>
```

HTML (Davomi)





3.6 XML

- * 1996 yil W3C tomonidan taklif etilgan
- * Web soxasida **turkumlashgan xujjatlarni jo'natish** imkoniyatlari rejalashtirilgan standartlar **Text shaklida bo'ladi**
- * SGMLda aniq kerak bo'lgan asosiy funksiyalarnigina joylashtiriladi (**SGMLning qismlarini yig'adi**)
- * XML va SGML o'rtasida **o'zgarish oson.**
- * Asosiy HTMLni kengaytiradi, to'ldirish–htmlga qaraganda **murakkab xujjatlarni yaratish** mumkin bo'lib struklashgan



3.7 PDF (Izohi)

- * **Portable Document Format** qisqartma so'zi
- * Windows yoki Mackintosh, Unix, OS/2 kabi qaysi kompyuter tizimi muhitiga(environment) qarab uzatish va o'qiy oladigan Format
- * Adobe firmasining **PostScript** tili asosida
- * Uning **siqish imkoniyatlarini o'z ichiga oladi**: internet/intranetlarda uzatish



PDF (Xususiyati)

- * **HTML**dagi Image va Text, Graphic Fayllarga qarab mavjud bo'lib, bunday **Fayllar linklar orqali** ekranda ko'rsatiladi
- * PDF File ichidagi barcha Text, Imagelar Graphic File ichida **to'g'ri joylashganda mavjud bo'ladi**
- * Font yoki Graphic kabi Vector asosida ko'rsatadi – Kengaytirib/ Kamaytirganda Font yoki Graphic pixellarini saqlaydi -



PDF Usage(Amalda qo'llanishi)

- * Turli xujjat Formatlarini har xil tizimlar muhitida ham birga egalik qiladi
- * Xujjat materiallarini siqqan(compressed) materiallar orqali uzatganda
- * Maxsus xujjatlarni uzoq masofaga yubo'rib, yuqori sifatli mahsulotlarni(resolution) Printing qilishni hoxlaganda



PDF (tuzilgan asosiy elementlar)

- * PDF **saxifa dona(page unit) yaratiladi** – Ekranda ham saxifa dona sifatida namoyish etiladi(ko'rsatadi)
- * PDF grafik ega bo'lgan **bitmap va vector imajelari** bo'lib, sound va video kabilar **multimedia muhitida qo'llab quvvatlaydi(support)**.
- * **Multimedia muhitini** qo'llab quvvatlab Format **AVI movie yoki QuickTime sound bo'lib** PDF ichida bo'lishini talab qiladi



3.8 Tex / Latex

- * Oddiy **buyruq(tag)** ni grammatikaga to'g'rilab moslagandan keyin, Faylni compile qilib font type, matematik formulani juda chiroyli qilib bera oladi.
- * Graph yoki image ham **Post Script Faylga o'zgaritib** boshqa Fayl ichida joylashtirishi mumkin



'Tex'ning yaratilishi

- * Stanford Universiteti professori **Donald Knuth yaratgan tizim**
- * O'zining kitobida nashr qilganda matematik kabi **tartibsiz narsalarni yechib yaratish** uchun
- * 'Source'gacha barcha ma'lumotlarni ochik **S/W(open software)**
- * 'Unix' va DOS, Windows, Macintosh kabi deyarli **barcha kompyuter tizimlaridagi faoliyat**



Latex

- * Latex yaratilishi - **Leslie Lamport** Tex user interfacelarini soddalashtirib yasagan
- * 'Tex'dan foydalanish xizmatlari
 - * Tex va Latex matematik-tabiiy fanlar (natural science), injinerlik(engineering) soxalarining **ilm-fan maqola(article) va hisobotlari(report) yaratilganda**
 - * Turli xil matematik yuki tabiiy fanlar, injinerlik soxalarida qo'llanadigan belgilar yoki bezaklarini **o'z ichikga olib xujjatni Nashr qilganda(publishing)**



4 Matn Tanish(Text recognition)

- * Text File bilan tanishib ko'rsak, **Matnni tanish** degan ma'noni anglatadi (text recognzation)
- * Kitobni scan qilib, image orqali kompreslagandan keyin, **matnni tanish programma bilan digital dataga kompreslash**
 - * **Elektron kutubxona** – Kitob yoki maqolalarni kompyuterda saqlab internet orqali o'qish imkoniyatlari



4.1 Matnni Tanish Texnikasi Tarixi

Matnni tanish texnikasi - **G.Tausheck**(German) 1928 yil **pattern matching qonuniyatidan** foydalanib matnni tanish bo'yicha asosiy ruxsatnomani olib ro'yxatdan o'tdi

- * 1950 yilda: **Oddiy pattern matnni tanish** bo'yicha izlanish(research) amalga oshirildi
- * 1960 yilda: **Ingliz matni, Yapon matni, Xitoy matnlarini tanish** bo'yicha izlanish amalga oshirildi
- * 1980 yilda: Ingliz tili/ Yapon tili/ Xitoy tili matnlarni tanishni foyda keladigan **program sotadi.**
- * Program 'Arimi'
 - * Koreys, Xitoy(16 mingta xarakter), Ingliz, Yapon, Nemis, Fransuz tili kabi **14 ta davlat tillarini** 1 daqiqada 300ta harfni yuqori tezlikda tushunadi
 - * **Jadvalli tushunish, rasmlarni birlashtirish(composition), videoga muharrirlik qila oladigan(editting)** dunyodagi eng birinchi bir necha



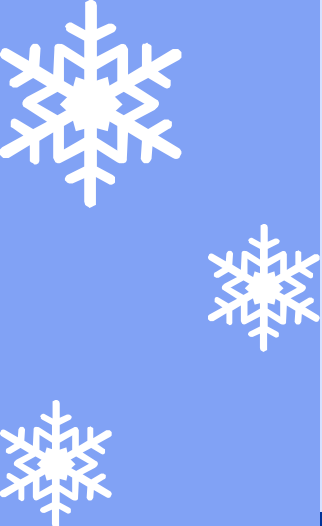
4.2 Matnni Tushunish Texnikasi Soxasi

- * Harf tanish texnikasiga kiruvchi metodlar:
 - * ON-LINE(real-time) tushunish metodi/ OFF-LINE tushunish metodi
- * ON-LINE(real-time) tushunish metodi:
 - * Yozuvchi elektron pendan foydalanib to'g'ridan to'g'ri kiradigan metod
 - * Imzo(signature) tanishtirish, yozuvchining tanishi kabilarni bajaradi
 - * Kompyuter kattalik minimumi(keyboard kerak emas), amalga oshiruvchi tomonidan yaqin foydalanuvchi interfaceni talab qiladi (friendly user interface)
 - * Input tezligi yozuvchining yozish tezligiga qarab **keyboardga qaraganda input tezlik sekin bo'lishi** uning kamchilik tomonidir
- * OFF-LINE tushunish metodi:
 - * Yozilgan xujjatlar yoki kitob kabilarda **print qilingan xujjatlarni skaner kabilardan foydalanib input olish** turli analiz algoritmlarni to'ldiradigan tushuncha
 - * ON-LINE tushunish metodiga qaraganda texnikasi qiyin
 - * **xujjat** tushunchasi, **jadval** tushunchasi, **mashina number** tushunchasi, **xarita(map)** tushunchasi kabilarda foydalaniladi



4.3 Harf Tushunchasini Amalga Oshiruvchi Uslub

- * **Application:**
- * **Xatlarni** tarmoq bo'yicha avtomatik ravishda siniflarga bo'lish (classification)
- * Turli **zaharli gazlarni (mashina)** avtomatik ravishda topish
- * **Tezlik oshirilgan mashina** uni avtomatik ravishda topish
- * **Mashinalar o'g'irlangan** uni avtomatik ravishda topish
- * Ishlab chiqarishda mahsulotlarning (product) sifatli **sifatsizlarini aniqlab berish**



4 Sound

Sound

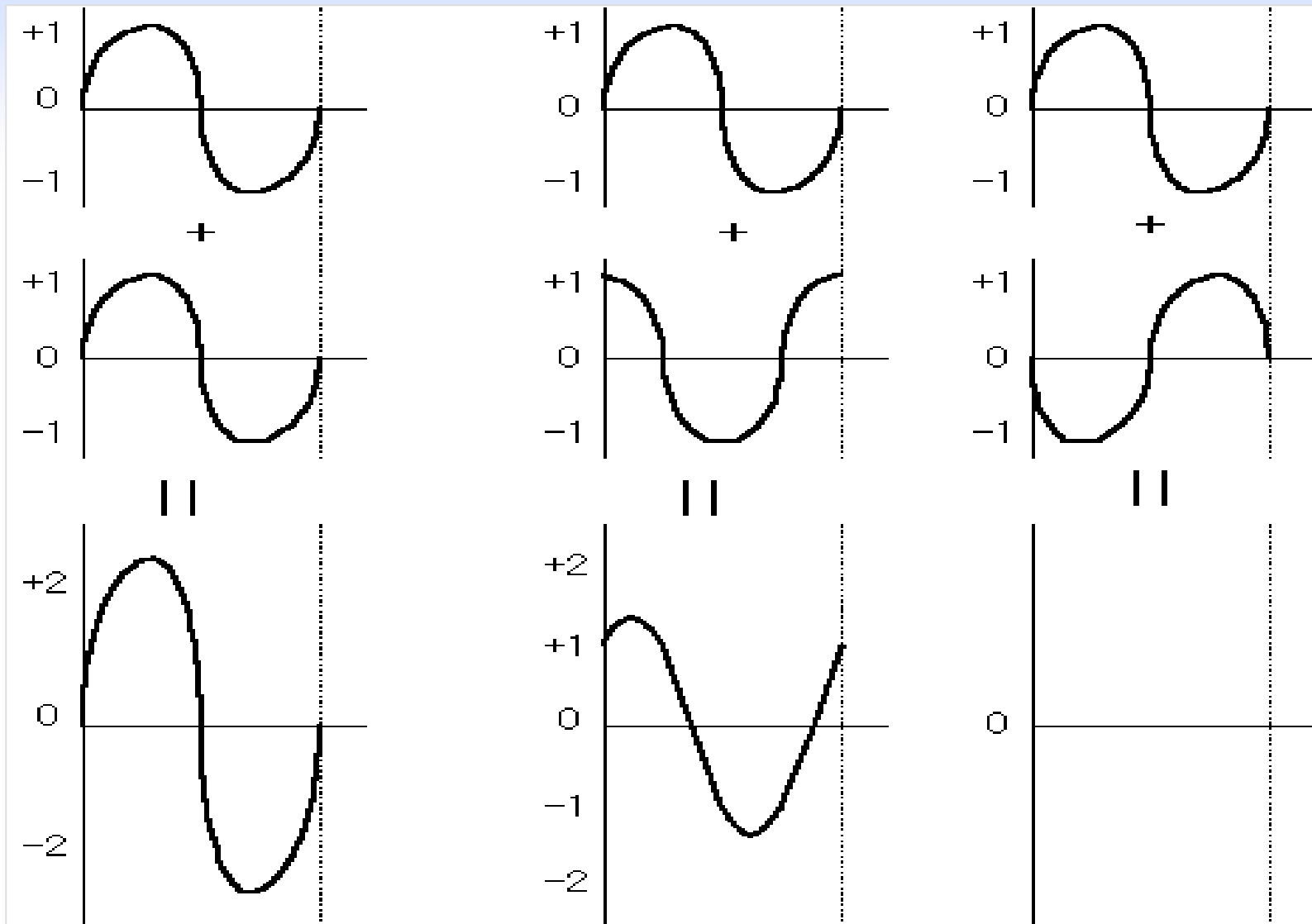
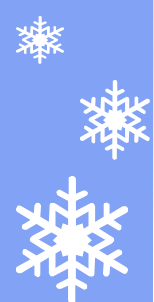


- * Vibratsiyadan boshlab soundning paydo bo'lishi hozirgi Analog signal radio, radiogrammalardan(audio system) rivojlangan bo'lib, hozirda mavjud Digital texnologiyalardan yordamida kompyuter uchun yaratish imkoniyatini yaratdi.



Sound(Ovoz) Asosi

- * Sound: Qaysi fizik vibratsiyasida amalga oshgan bo'lsa fizik shaklda bo'ladi(Sound Source -> Air Vibration -> Ear sense)
- * Period(time): Teng bo'lgan soundning to'lqin turlari teng bo'lganda interval ko'rinishidagi shakl yana qaytariladi, bir xil shakl bir marta paydo bo'lgandagi kerak vaqt
- * Frequency: Electric wave yoki sound wave aksi, refraksiya to'lqin yo'nalishi davriy o'zgarish shakli 1 daqiqa davomida qaytariladigan son. (Qiyamat Hertz (Hz)/KHz, MHz), : frequency baland bo'lsa baland ovoz, frequency past bo'lsa past ovoz bo'ladi
- * Amplitude: soundning kataligi/wavening eng tepadan eng pastgacha interval
- * Sound wave shakli tabiiy ravishda paydo bo'lgani sababli davriy shakl bo'lmasdan
- * musiqa asbobidan chiqadigan sound yoki inson ovozinging undosh tovushi kabi sound davriy shakl bo'ladi,
- * suv ovozi yoki his xayajon tovushlar kabi tovushlar insonning ovozi unli, davriy bo'lmagan shakl bo'ladi



O'zaro har xil ikki tovushning uyg'unlashishi



Sound Ifodasi

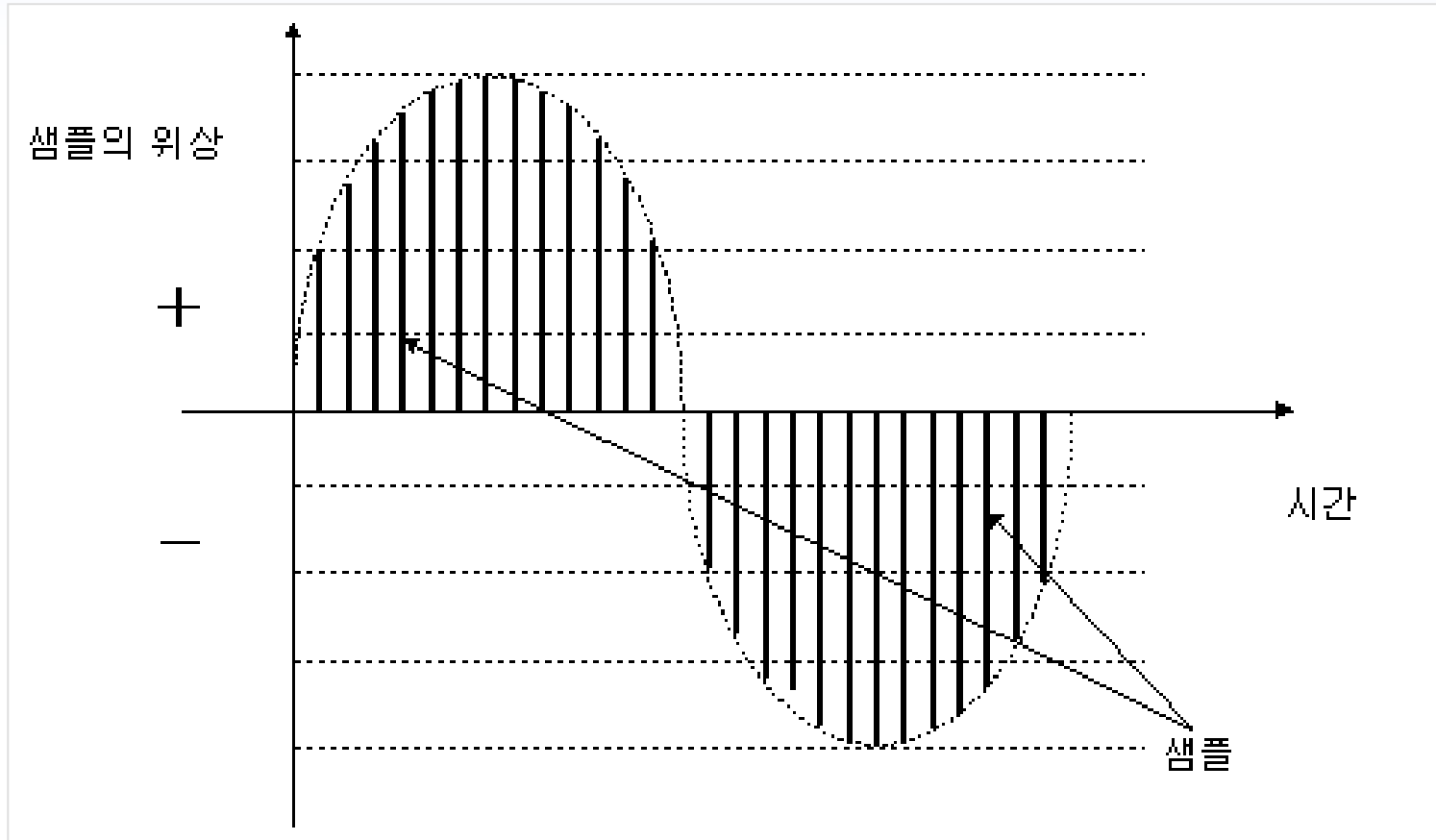
- * Eshitish mumkin bo'lgan frequency (chastota/audio frequency) : 20Hz ~ 20KHz atrofida
- * Sound signalini yaratganda tashqarigi sound signalini oladigan Hardware dizayni paytida insonning eshitish mumkin bo'lgan chastota faqat shu orqali boshqarish mumkin bo'lsa Hardware strukturasi soddalashtiradi(simplify).
- * Tabiiy sound(analog) -> Computer sound(digital)
- * Analog: Tabiatda chiqadigan Sound bo'lib, sound va nur, electric current, voltage kabi va shunga linear narxiga ega bo'lib davomli shaklli signal.
- * Digital: Kompyuterning asosiy signal sistemasi, davomiy bo'lmagan ketma-ket narxga ega bo'lgan signal bo'lib 0 va 1 birgalikda bo'lgan holatini ko'rsatadi
- * Kompyuter sound signalni boshqarish uchun Analog signalni Digital signalga o'zgartiradigan vazifa kerak bo'lib bu uchun **Sampling metodi keng ishlatiladi**



Sampling Metodi

- * Tabiiy soundni kompyuter yoki Digital musiqa asbobidan foydalanish uchun Sampling kabi ish kerak
- * Analog signalni discrete signalga o'zgartiradigan bo'lsak Nyquist qonuniyatiga qarab Sampling frequency(chastota)si eng past bo'lsa 2 barobardan katta bo'lsa buni yana Analog signalga o'zgartirish mumkin
- * Audio holatidagi Sampling tezligi 44.1 KHz,
16 bitli

Sampling Skill



rasm1. Analog signalni diskrit signalga o'zgartirish uchun Sampling



File Saqlash Metodi

- * Sound Wave shaklini
 - * teng ko'rsatadigan Wave shakli,
 - * musiqa asbobi notasi va uni o'ynash vaqtini ko'rsatadigan MIDI(Musical Instrument Digital Interface) metodidan ikki ko'rinishda foydalanish mumkin
- * Wave metodidan foydalangan File turi: WAV, VOC, AU, AIFF(Audio Interchange File Format) kabilar
- * MIDI metodi File turi: MID, RMI, MOD kabilar



WAV

- * PCda mavjud eng Sound saqlovchi Format vakillari: Microsoftda foydalanadigan RIFF metodi - Compress metodi va oddiy Datani saqlash mumkin bo'lgan turi
- * PCda Wave Filelarni yaratish uchun Sound Card kerak
- * Sound Card PC extension Slotda qo'ygandan keyin, Microphone bo'lsa uni Sound cardga bog'lagandan keyin ovoz



WAV

- * Microphone o'rniga musiqa sound chiqadigan qurilmani ulagan holatda musiqa ma'lumotini saqlash mumkin(CD Player/Audio Player...)
- * Sound Card Analog signalni Digital signalga o'zgartiradigan ADC(Analog-to-digital converter) vazifasini bajaradi
- * Hozirda PCda ishlatiladigan Wave Fayllarni ishlatish qisqa vaqt davomida musiqa ma'lumotini saqlagandan keyin davomiy ravishda qaytadan replay(qaytadan o'ynash) yoki edit(muharrirlik) qiladiganda ishlatiladigan qonuniyat bu Application Metodidir.

PCM Metodi va ADPCM Metodi

- * Analog Sound asosida PCM Metodi bilan Sampling bo'lib Digital Soundga o'zgargani bilan PCM Metodi hajmi katta bo'lganligi sababli ADPCM Metodidan foydalanadi

* PCM Metodi (Pulse Code Modulation)

- * PCM Metodi rasm1. va u bilan o'rnatilgan qiymatni o'z holicha saqlash qonuniyati bilan Compress qilmagani sababli hajmi kattadir
- * PCM Metodi CD yoki DAT(Digital Audio Tape) kabilardan foydalanadi

* ADPCM (Adaptive Differential Pulse Code Modulation) Metodi

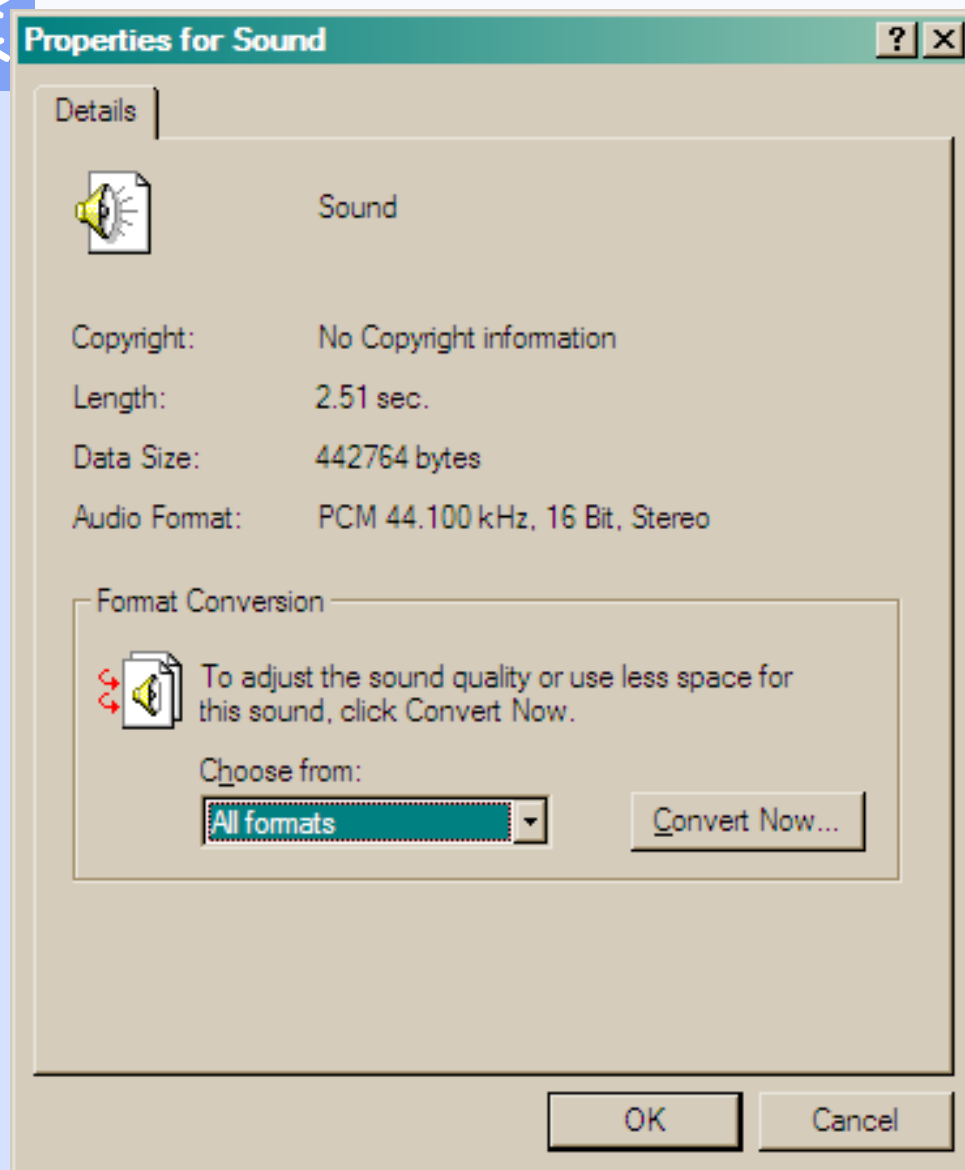
- * IMA (Interactive Multimedia Association) taklif etgan (proposal) Metod Digitallashtirish natijasida PCM Metodi kabi o'z holicha saqlamaydi, to'g'ri undan oldingi signal va uni farqini (differential) saqlovchi Metoddur.
- * Farqini o'z holicha saqlovchi qonuniy DPCM bo'lib faqat o'sha farqdan foydalangan holda hajmni kichikraytiradi
- * Lekin farqi katta bo'lgan holatda DPCM samaradorligi ham tushib ketadi, bunday masalani hal qilish uchun bo'lgan qonuniyat ADPCM metodi paydo bo'ldi
- * O'zgarish intervali katta bo'lganda signal farqini ifodalovchi unit qiymatni kattalashtirib bunday bo'lmagan holatlarda aksincha kichiklashtiruvchi batafsil signal ifodasi bilan birgalikda signalning o'zgarish intervalini kattalashtirganda ham kichik qila oladigan qonuniyatdir



WAV (PCM)

- * 8 bit Mono: 8bit sample, mono(no right/left channel)
- * 8 bit Stereo: 8bit sample, right/left channel
 - * 0- left channel(8 bit sample)/ 1- right channel(8 bit sample)
- * 16 bit Mono: 16bit sample, mono
- * 16 bit Stereo: 16bit sample, right/left channel
 - * 0- left channel(16 bit sample)/ 1- right channel(16 bit sample)⁷⁶

WAV



Wav File reference
Ma'lumoti



7.4.1 WAV



Wav file play



MP3

- * Internetning ommaviylashtirish bilan birga hozirda odamlar o'rtasida muhim joy ham oldi. Sound File Format to'g'ri MP3 (MPEG Audio Layer-3) bo'lib, MP3 fayl katta kichik bo'lsa ham CD bilan birga soundni sifatli ijro etadi.
- * Hajmi juda kichik bo'lgani sababli bitta CD ga 100 dan oritq kiritish mumkin, MP3 bitta CDga to'ldirsak musiqa CDdan taxminan 10ta kerak bo'ladi
- * CD kiritilgan musiqalarga qaraganda MP3da yasalgan usul juda oddiy
- * MP3 Imkoniyatlari
 - * MP3 Multimedia va shu bilan birga har bir teleradio ko'rsatuvlarga foydalanish soxasi juda keng.
 - * MP3 orqali Game CD yoki Multimedia CD ishlab chiqarish ilgarigi vaqtga qaraganda juda sifatli mahsulotlar(product) ishlab chiqarilmoqda(produce)

- * Mu-law Compress metodidan foydalanish
Unix muhitida anchadan buyon foydalanib
kelinmoqda
- * Web muhitida tez-tez paydo bo'lib oddiy
PC muhitida yaxshi foydalanib bo'lmaydi
- * Faylni ochib ko'rsak, WAV fayliga
qaraganda AU faylidagi musiqa tovushi
sifati tushganini bilib olsak bo'ladi.(AU
sifati uncha yaxsh emas)

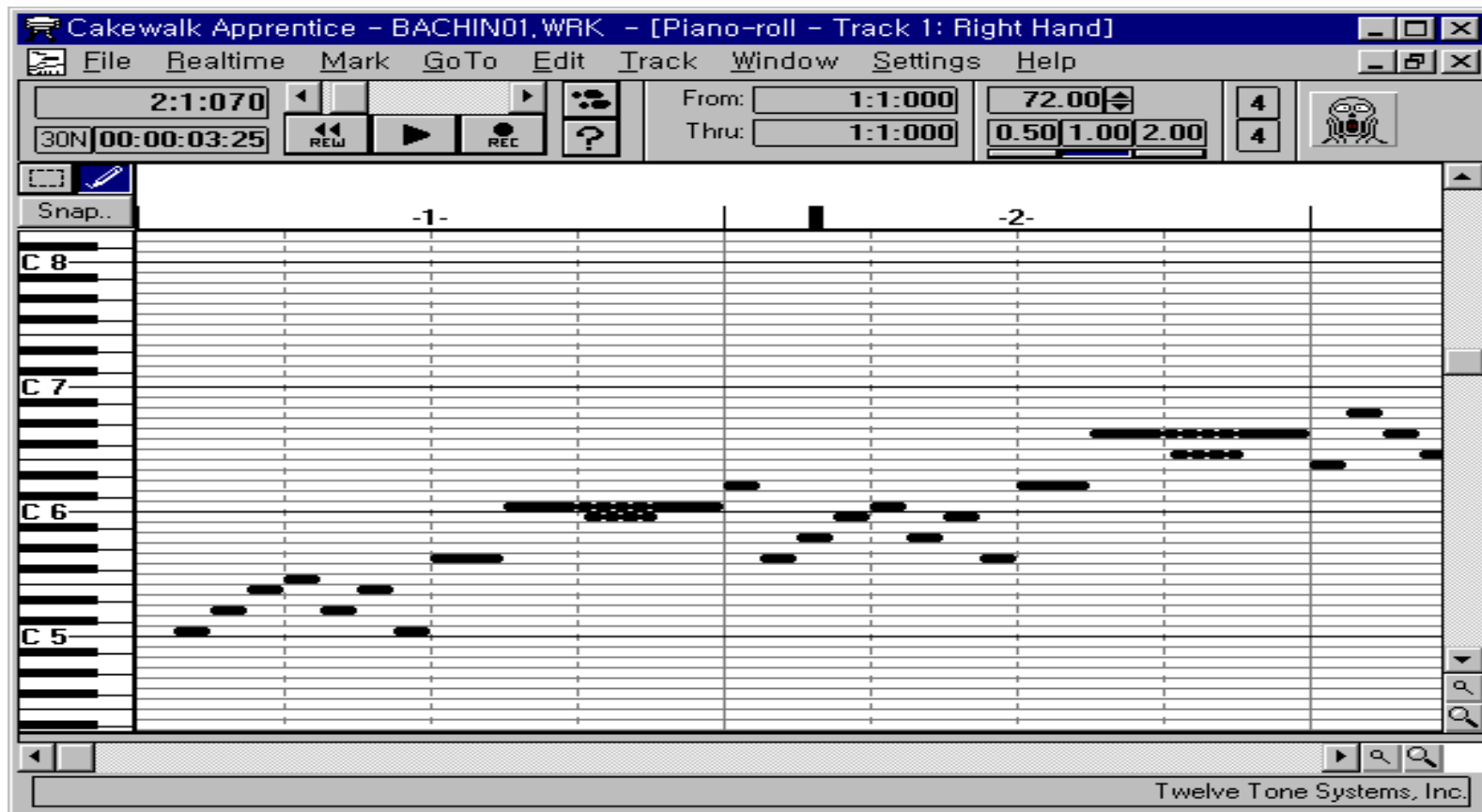


MIDI



- * MIDI File vakillaridan Format bo'lib, faylni bir Header ma'lumotni va bir necha turdagi Track ma'lumotlaridan tarkib topgan bo'ladi.
- * Header, Track soni haqidagi ma'lumot yozib
- * Track, play (ijrosi)ga qarab paydo bo'ladigan Event vaqt ma'lumotni va Eventning o'zi haqidagi ma'lumotni tartib bo'yicha yozadi.
- * Sampler: real sound Digital metodi bilan to'g'ri recording qilgandan keyin uni xohlagan shaklida yaratib instrument yoki sound effect kabilardan foydalaniladi.(katta hajm storage kerak)
 - * Oscillator degan asbob uchun sound yaratib beradigan Synthesizer
- * Mixer: Bitta Stereo yozishida turli asboblarning output signallarini yozib olish uchun shu signallarni mos keltirib mix qilish uchun Mixer degan instrumentdan foydalaniladi
 - * Balance boshqarish(input / output signal)
 - * Equalizer orqali base va treble boshqarish
- * 4minute MIDI file = taqminan 50KB ~ 120KB

MID / RMI



Cakewalk Program Asosiy Ekrani

RMI file: MID filening kamchiligi file ma'lumot saqkrash mumkin.



MOD

- * Sampling bo'lgan Sound Datalarni Software qonuniyatlari bilan o'zgartirib, qo'shib musiqani chiqaradi(AMIGA Systemdan)
- * MOD fayl MID kabi notalar ma'lumoti bilan birga WAV bilan bir xil musiqa manbasini(music source) o'z ichiga oladi.
- * 4ta musiqa asbobi ishtirok etgan musiqa 4 Trackdan foydalanilgan bo'ladi. Odatda 4~8ta Trackdan foydalaniladi, eng ko'pi bilan 32 Track qo'llab quvvatlovchi Formatdan ham foydalanish mumkin.
- * Yomon tomoni shuki bu jarayon qiyin bo'lib MIDIga qaraganda musiqa sifati bir oz tushgan bo'ladi.
- * MOD faylini yasash Programmasini Tracker deb atab, StarTracker, Scream Tracker, Fast Tracker, Digi Tracker kabi turlari ham bo'lib har bir Programmada original File Formati mavjud



Sound Editting

- * Professional Sound edit qilish jarayonida qimmatbaho musiqa asboblari ega bo'lib, Studioda amalga oshirsak,
- * oddiy jarayon, misol uchun wav file copy, cut, paste kabi Windows asosi bo'lgan vositalar orqali amalga oshirish ovoz yozish imkoniyatlari ham mavjud(Sound Recorder)
- * Aloqa yoki Internet soxasida osongina topa oladigan sound edit Software dan foydalansak turli effektlarni ko'rsatish imkoniyatlari mavjud
- * Sound Software Vakillari:
 - * Windows Muhitida: Cool Edit, Wave Edit, Sound Forge kabilar.
 - * Macintosh Muhitida: Protools, Sound Edit Pro kabilar.



Sound Muharriri



Windows Sound Recorder



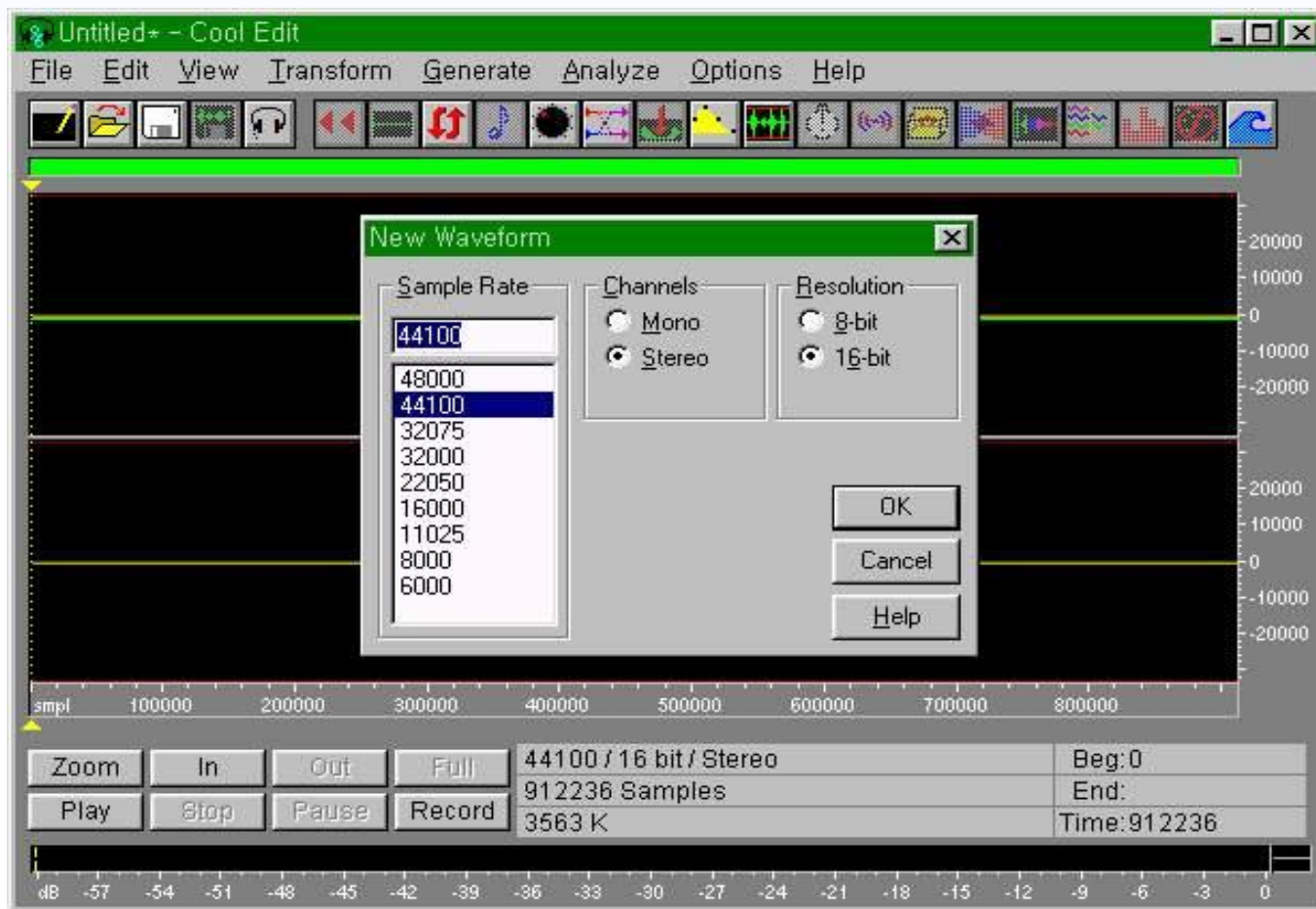
Wave Faylini Yozish

1) Sound Input

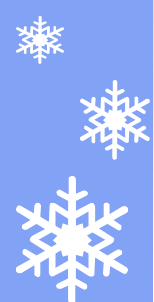
- ① Data Formatni tanlaydi. Sample rate, Resolution(bit-depth aniqlash)ni tanlaydi.
- ② Amaldagi File Channel Collection, 'Stereo' yoki 'Mono'ligini tanlagandan keyin "OK" tugmachasini bosadi.
- ③ "Record" tugmasini bossak recording (yozish) boshlanadi. "Stop" tugmasini bossak recording tugab, Wav file yana bitta yasaladi.



Wave Faylini Yozish



Data Format kichik oynachasi



Wave Faylini Yozish



Yozish tugagan Wave fileni to'ldirish



Wave Faylini Yozish

- * Musiqa CD bo'lgan holatda 44.1KHz frequency (chastotada) 16 bit Stereo bilan yozsak bo'ladi, lekin bunda musiqa sifati Wav file 40MBdan ortiq katta bo'lishi kerak.
- * Mashhur yoki Classic musiqalar yaxshi sifatli CDlarda bo'ladi, lekin shu bilan birga Faylning katta yomon tarafi shuki Homepagedagi background music kabi compress qilingan Format talab qilingan joyda foydalanish qiyin



Wave Faylini Yozish

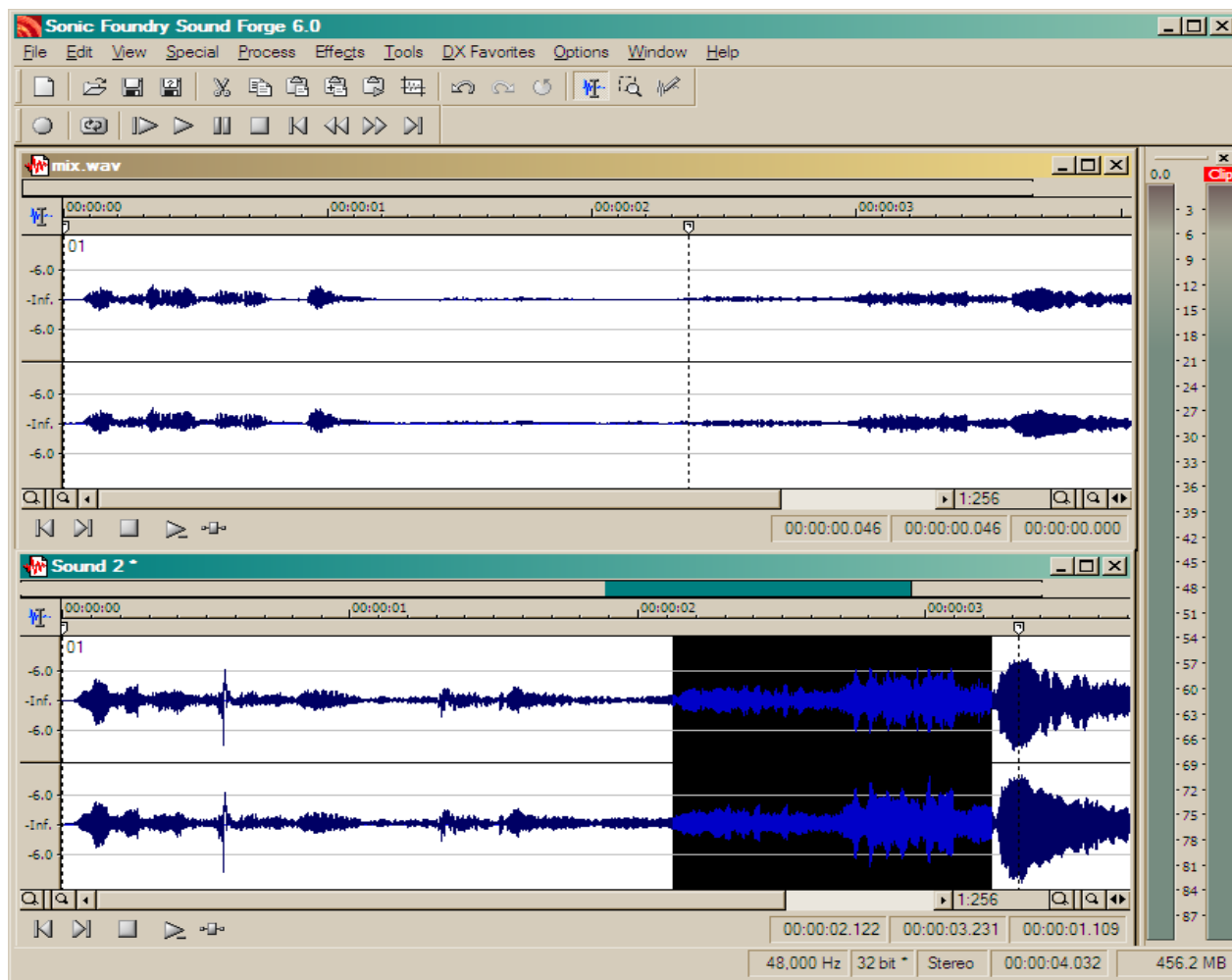
2) Musiqa CDda Wave File Qo'llanishi

- * Musiqa CDdan boshlab maxsus qism yoki, kerak kattalik, yoki vaqt kabi Soundlarni tanlab olsak foydalanuvchi xohlagan shaklda background music yoki Sample music kabilarni yaratadi.
- * MP3 Grabber Extreme degan programma MP3 Fayli Wave Faylga o'zgarishi mumkin bo'lib, Audio CDni Wave Faylga o'zgartirib berish mumkin



Wave Faylini Yozish

Clip qiladigan qismni mouse bilan tanlash





Wave Faylini Yozish

- * ① Xohlagan qismni mouse bilan belgilanadi.
- * ② Belgilangan qism [Edit] [Copy] buyruqlari bilan foydalanib copy (nusxa) qilinadi.
- * ③ Insert qilingan qism belgilanib [Edit] [Paste] yordamida yopishtiriladi.

Wave Faylini Yozish

Nusxa(copy) qiladigan qismni ko'chirib qo'yish

The screenshot displays the Sonic Foundry Sound Forge 6.0 interface. The main window shows two audio tracks: 'mix.wav' and 'Sound 2'. Both tracks have a blue highlighted segment between approximately 00:00:01.340 and 00:00:02.548. The 'mix.wav' track has a 'Clip' indicator on the right. The 'Sound 2' track has a 'Clip' indicator on the right. The interface includes a menu bar (File, Edit, View, Special, Process, Effects, Tools, DX Favorites, Options, Window, Help), a toolbar with various editing tools, and a status bar at the bottom showing processing time (0.001 seconds), sample rate (44,100 Hz), bit depth (24 bit), format (Stereo), and file size (457.0 MB).



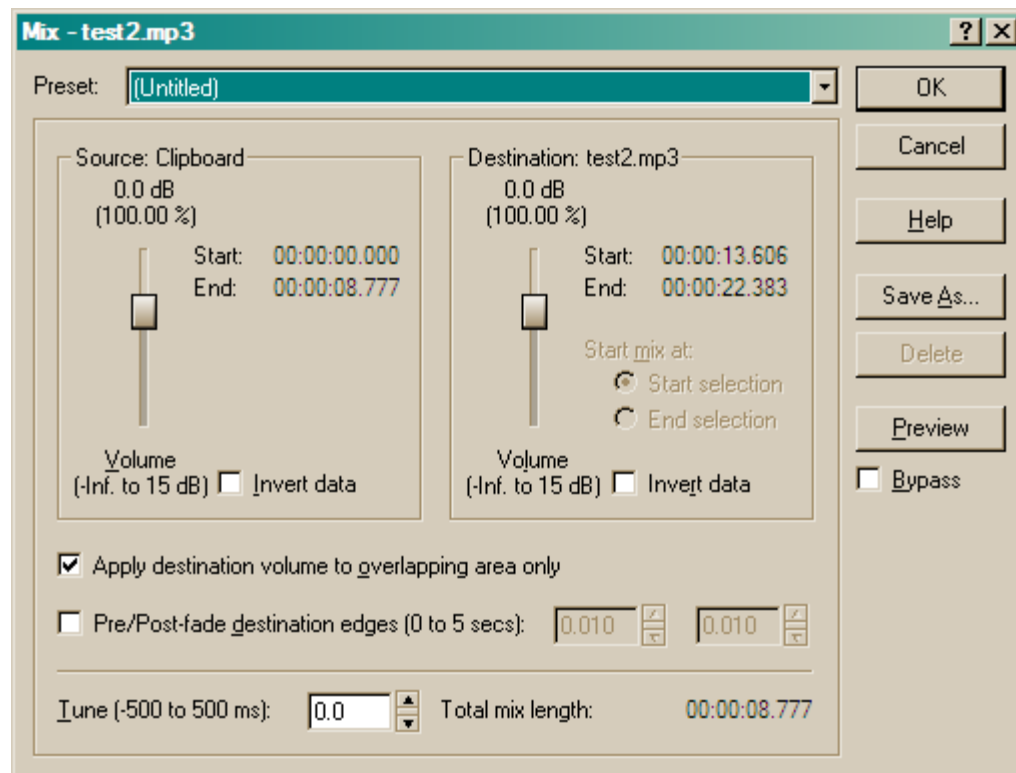
Wave Faylini Yozish

3) Sound Mixer

- * Sound Mixer: Ikkidan ortiq Sound Faylini bittaga birlashtirib bir vaqtda ijro etadi(excute).
- * Mixing xarakterli typeni copy qilish funksiyasi bo'lib copy qilayotganda original faylni copy qiliniyotgan Faylning Wave qiymatini qo'shadigan metod.
 - ① Oldingi ikki Faylni Mixing qilish uchun Fayl Format bilan birga qilish kerak.
 - ② Mixing qilinadigan qism mouse bilan tanlanadi.
 - ③ [Edit] [paste special][Mix]larni tanlasak Mix Paste dialog box chiqadi.
 - ④ OK tugmasini bossak Mixing yakunlanadi.

4) Wave File hajmini qisqartirish

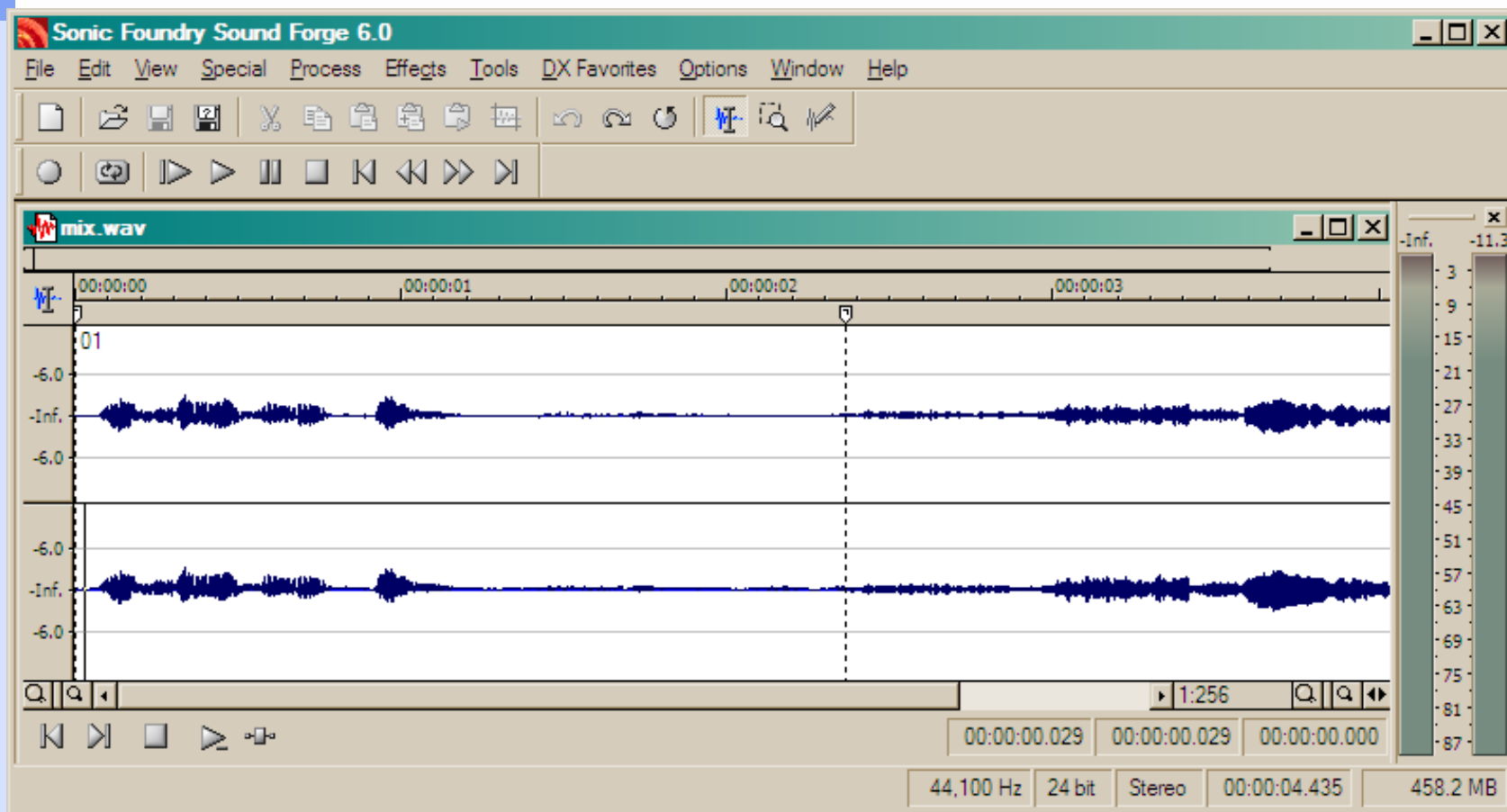
Wave File Yozisy



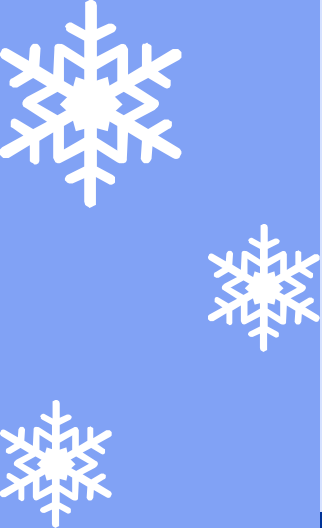
Mix Paste kichik oynachasi



Wave Faylini Yozish



Sound Mixing



3 Graphic va Image



Asosiy Tushunchalar

- * Multimedia quyidagi besh unsurdan tashkil topgan:
Text, Image, Sound, Video, Animation
- * Image - **ko'plab ma'lumotlarni** o'z ichida saqlagan iboradir
- * 2-dimension Image va 3-dimension Image bor.
- * Computer Graphics -> Image yaratuvchi qonuniyat(method) va ibora(visualization)dan boshlanadi
 - * Application: Industry design, Web design, kinofilmlardagi qo'llanishi
- * **Image processing**: image filtering, noise



Image Saqlash va Iboralari Metodi

Bitmap metodi: Nuqtalarning birlashishi Imagelarni ifodalaydigan metod

- * Faylning kattaligi boshqa fayl aloqada bo'lgan ma'lumotlarni Fayl Headerga qo'yib **har bir Pixel Color qiymatini o'z holicha ifodalaydigan qonuniyatdir.**
- * Ibora tezligi Vector metodi bilan solishtirsak **tez** - rasmni Monitor ekranida paydo qila oladigan datalarni **Video Memory tomon to'g'ridan to'g'ri ko'chirishni boshqaradi.**
- * **Ko'plab disk hajmini oladi** - Pixel har bir **Brightness va hue ma'lumotlarining** hammasini saqlaydi
- * Rasmni kengaytirish yoki kichraytirilgan holatlarda rasmning shakli yoki tashqi chizig'i qismlari o'zgaradigan **yomon tomoni mavjud**
- * DDB(Device Dependent Bitmap)va DIB(Device Independent Bitmap)

* **Vector metodi** : (buyruq)command va coordinate value

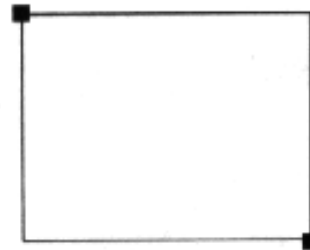
* Pixel (picture element): Monitor ekranida chiqadigan har bir nuqta



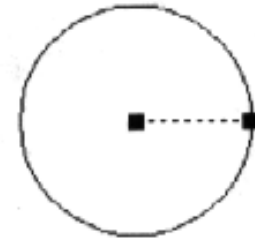
Vetor Image



선



사각형



원



BMP(support MS)

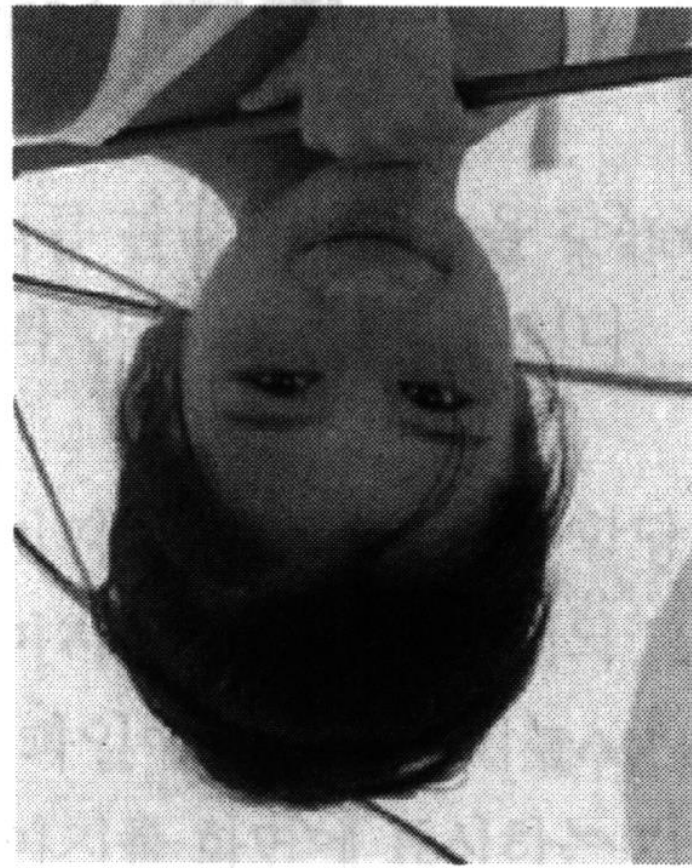
- * Bitmap Fayl haqida ma'lumot
 - * **BITMAP FILE HEADER** Bitmap Fayl haqidagi ma'lumotni saqlash uchun struktura sxemasini(sckema) aniqlaydi
 - * **bfType** qaysi fayl **BMP fayl ekanligini aniqlash**
 - * Har doim ASCII character **"BM"** qiymatidan boshlanadi
 - * **bfSize** fayl ozi **kataligi**
 - * **bfReserved** kelajakda **kengaytirish uchun** e'tiborga olib tayyor bo'lish
- * Bitmap o'zi haqida ma'lumot
 - * **BITMAP INFO HEADER**: Butun 40 Bytedan Bitmap o'zi haqida ma'lumotlarni saqlash uchun struktura
- * Bitmap Palette
 - * **RGB QUAD struktura** sxemasini to'g'rilashni aniqlaydi
 - * Map Index: **RGB(Red, Green, Blue) hue qiymati saqlaydi.**
- * Image Pixel Data: Ozi Pixel Data



Image Pixel Data



<in Computer Monitor>



<in Memory>



BitMap Structure

```
typedef struct {  
    unsigned short bfType; // always 'BM'  
    unsigned long bfSize; // bitmap file size  
    unsigned short bfReserved1; // reserved  
    unsigned short bfReserved2; // reserved  
    unsigned long bfOffBits; // offset } BitmapFileHeader;
```

```
typedef struct {  
    unsigned long biSize; // this structure size  
    unsigned long biWidth; // width  
    unsigned long biHeight; // height  
    unsigned short biPlanes; // number of plane (always 1)  
    unsigned short biBitCount; // bit per pixel. usually 8  
    unsigned long biCompress; // compression no/yes  
    unsigned long biSizeImage; // real image size before compression  
    unsigned long biXPelsPerMeter; // x resolution  
    unsigned long biYPelsPerMeter; // y resolution  
    unsigned long biClrUse; // number of used color  
    unsigned long biClrImportant; // important color index} BitmapInfoHeader;
```

```
typedef struct {  
    BitmapFileHeader bmfHeader;  
    BitmapInfoHeader bmiHeader;  
    unsigned long nPal[256]; //Palete  
    unsigned char cData[1]; //image data} Bitmap;
```



JPG, JPEG

- * JPEG : **J**oint **P**hotographic **E**xperts **G**roupda rivojlangan compress metodi
- * JPEG: Deyarli Multimedia soxasidan **rasmni compress(siqish) eng foydali Format**
 - * **Webda standartlarda keng qo'llanishi**
 - * Huffman encoding, sequential JPEG va 8 bit Samplinglardan foydalanadi
 - * Progressive JPEG: Componentlari Multiscandan encoding bo'ladi
- * JPEG encoding (4 jarayoni mavjud)
 - 1) Pixel Datalar RGBdan YCbCr color spacega o'zgarib Samplingni amalga oshiradi
 - 2) 8 Bit blockni bir Data unit(miqdori)da ko'rib DCT(Discrete Cosine Transform) o'zgaradi
 - 3) (Quantizing)Miqdoriy tartibda bu jarayoni compress davomida yo'qotadi (lossly compression)
 - 4) Miqdor bo'lgan DCT parameter belgilashtiradigan jarayon



GIF

- * GIF(Graphical Interchange Format)-CompuServ Corp yaratdi. Palette foydalanadigan 256 rang bilangina qo'llab quvvatlovchi vakillardan(representative) compress(siquvchi) Format
 - * Rasm Image(Picture) holatidan compress qilish natijasida katta bo'lmagan illustrator yaratgan grafik fayl holatini baland compress natijasida bo'lishi mumkin.
 - * Hue ma'lumoti o'z holicha qo'yib compress qiladigan JPG va boshq GIF hue ma'lumotlar kattaligini kamaytiradigan narsa(256 color Palette)
 - * Turli hue(rang) joylarida ega bo'ladigan Imagelar-> JPG(compress qilish) natijasi yaxsi,
 - * aksincha ko'plab ranglar ishlatilmagan Imagelarda -> GIF(rang joylari kamayishi) natijasi yaxsi.
- * Interlacing GIF: chap va tepa tomomdan on va past tomomgacha Image Loading bo'lganda Imagening ravshanligi oshirib beradigan shakldir
- * Transparent(Ravshanlik) GIF:(GIF89a)- background bilan yaxsi moc bo'lish uchun.

web page mavzusi yoki Image background color tabiiy ravishda yopishtirishni qo'llab quvvatlovchi shakldir



Boshqa Image Iboralar Metodi

- * TIFF(**T**agged **I**mage **F**ile **F**ormat): using tag information
- * PCX(**Z**Soft PC **P**aintbrush **B**itmap file, **P**ackbits **C**ompression index): started at 16bit color system
- * TGA(**T**ar**G**A) video jarayonlari uchun to'g'ri foydalanadigan board **TARGA board ismidan olingan Format**
- * PNG(**P**ortable **N**etwork **G**raphics)ga rivojlantirilgan Format: **JPG va GIFning kuchlilikni oldi**. support interlacing va transparent. using lossless compression algorithm. kelajakda webda foydalanadi.
- * ICO(**I**CO**N**s) Iconning Bitmap belgilaridangina foydalanadigan Format
- * CGM(**C**omputer **G**raphics **M**atafile): support PC software. ISO standard, support vector va bitmap
- * EPS(**E**ncapsulated **P**ost**S**cript): using *.eps, *.ps extension, for special graphic output device(printer etc)
- * WMF(**W**indows **M**atafile **F**ormat) to give and take image between windows application program. mata metodi, shuning uchun bitmap va vector imageni bitta filoga ifodalash paytda



Interpolation

* Interpolation

* Linear Interpolation: Chiziq ustida ikki nuqta ichida yangi nuqtani yaratish(2-dimension)

* Cubic Interpolation: 3-dimension(o'lchov) bo'shliqda **8ta nuqtani faraz qilib yana bitta yangi nuqtani yaratish**

* Aliasing Effectni Interpolation orqali yana edit qilib, **tabiiy chiziq(smooth line) bilan ifodalash mumkin**

* **Ray(nur) casting: Volume Renderingda oxirgi Pixel qiymatini qaror qilish uchun foydalanadi**

* Har bir Ray(nur) Voxel (volume element)lari



Illumination va Shadow

- ◆ **Lighting Model va Illumination Model** natijalarini bajaradi
- ◆ Narsa buyum bir xil rangda ifodalashga qaraganda haqqoniyligini(reality) va hajmini(solidity) berish uchun Illumination va shadowdan foydalaniladi
- ◆ **Light**: Ambient light (tashqi yorug'lik), directional light (yo'naltiruvchi yorug'lik), spotlight (projektor), point light (yorug'lik nuqtasi).



- ◆ **Texture**dan foydalanganda golf to'pchasi rasmi
Ambient light, Spotlight yorug'lik manbaidan foydalanib **shadow (soya) va yorug'lik** manbaini yaratadi, haqiqiy bo'lgan Rendering bo'ladi.

Ray Tracingdan foydalanganda haqqiniy va tashqi ko'rinishini ifodalaydi



Volume Rendering

- * Volume Rendering: Image Space Rendering va Object Space Rendering bor.
- * Image Space Rendering Method:
 - * Viewing paytini qaror qilib Image plane har bir pixelida ray(nur)ni o'tkazib bir xil intervalda Pixelning qiymati va joylashishini Sampling qilganda,
 - * Har bir Ray to'g'ri chiziq qo'yib Voxel (volume element)larining lightness va Saturation qo'shib Imageni yaratadigan Algorithm. Ray tracing metodi mavjud
 - * Volume Datani raqamlar bo'yicha ko'rib chiqsak Voxel(volume element)ni Image tomoniga teshib o'tib Imageni yaratadigan Algorithm.



Volume Rendering

- * Umuman Volume Rendering shading zinasida Voxel lightness qiymatini qaror qiladi
- * Classification(Turkumlashtirish)
Zinapoyasi:
Voxelning Saturation qaror qilingan zinapoya bo'lib, object ichida o'zaro boshqa materiallar sifati sababli Saturation qiymati har xil bo'ladi.
Bunday ma'lumotlarni yig'ib Rendering qilgnada ichki boundary areani ajrata oladigan bo'lib objectning ichki ko'rinishini ko'z bilan ko'rish mumkin
- * Jamlash Zinasi:



Volume Rendering



Volume Graphics Simulation



Color Model

- * 1931yilda illumination bo'lgan CIE(Commission International del' Eclairage)dan 3-dimension modelini tanishtirish
- * Visual ray(odam ko'lish mumkin ray) to'lqin uzunligi(wave length): 380nm(nano)dan 789nmgacha
Qizil rang($r = 700\text{nm}$), Yashil rang ($g = 546.1$), Ko'k rang ($b = 435.8$)larning to'lqin uzunligi
- * High color: 16 bitli colordan foydalangan holda qizil rang, yashil rang, ko'k ranglar o'rtasidan bitta rangni 32 xil rangga o'zgarishini ko'rsatadi¹³



HLS Color Model

* RGB -> HLS

Red, Green, Blue ranglarini Hue(color tone value(strong/weak)), Lightness(color light degree/ brilliance), Saturationga (color clearness degree) o'zgarishi mumkin

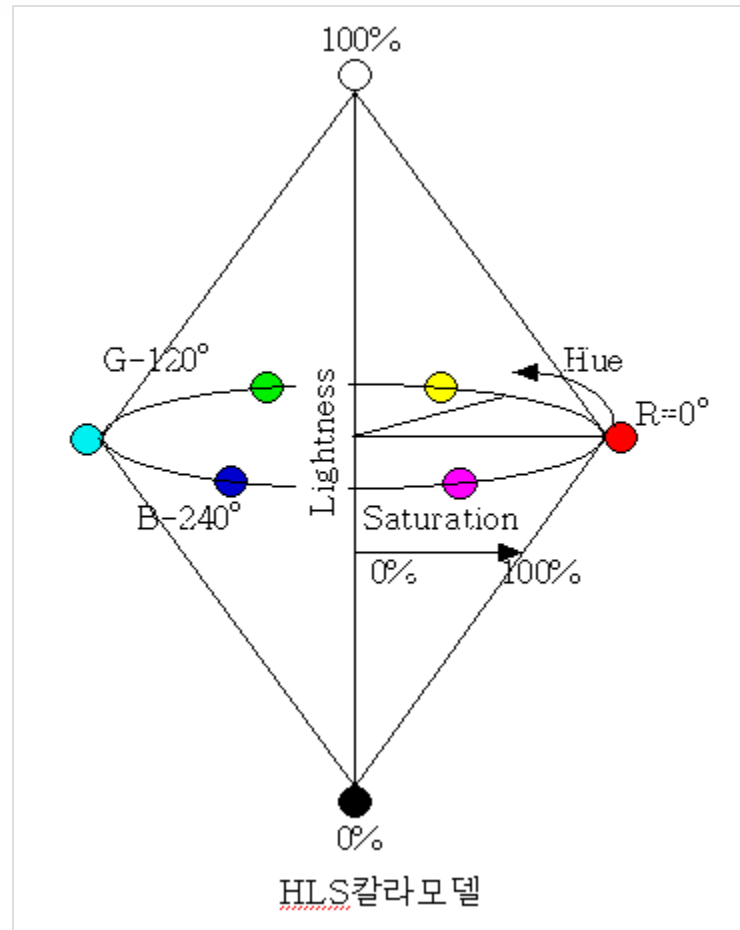
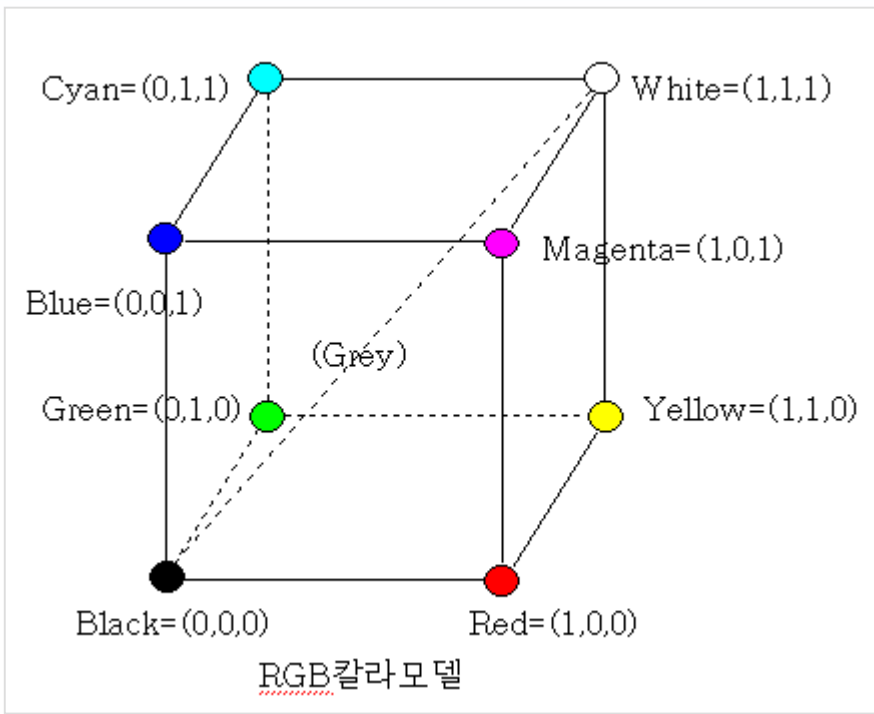
* **Yaxshi tomoni:** Ko'rish mumkin bo'lganda paydo bo'ladigan RGBdan, ajratish qiyin bo'lgan HLS ifodalanishi paydo bo'ladigan qismi mavjud

* **Lightness va Saturation:** 0 ~ 1ni ko'rsatadi

Hue(color): 0 daraja ~ 359 darajani



HLS Color Model



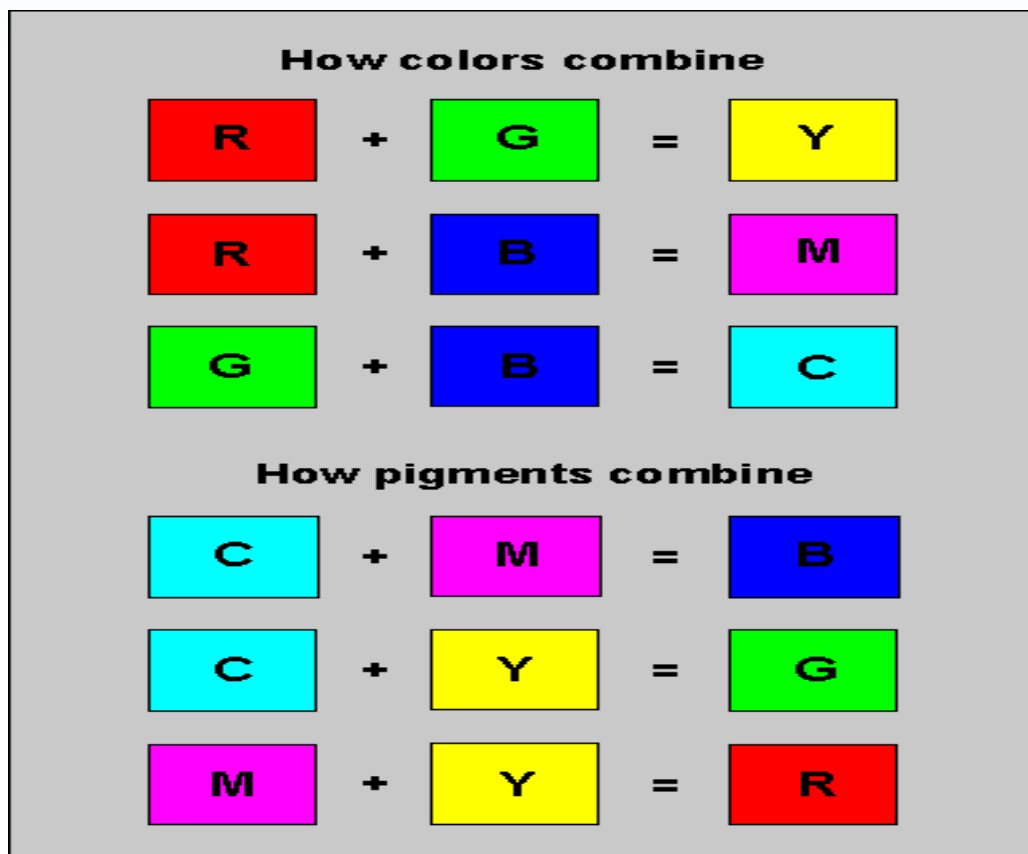
Graphdagi ifodalangan RGB va HLS Color Model



CMYK Color Model

- * CMYK Color: Rasm chizishdagi siyohdondagi(ink) 3 xil rang -> printer ishilatadi
 - * Cyan + Magenta + Yellow = Black (K)
 - * Cyan: 1(White)dan qizil rang qo'yish qiymati
 - * Magenta: 1dan yashil rang qo'yish qiymati
 - * Yellow: 1dan ko'k rang qo'yish qiymati
 - * Complementary color: $A_{color} + A'_{color} = 1$ (White)
- * Print qilgan holatda CMYK Color bo'yoqlardan foydalanadi

CMYK Color Model



RGB va CMYning O'zaro Aloqasi

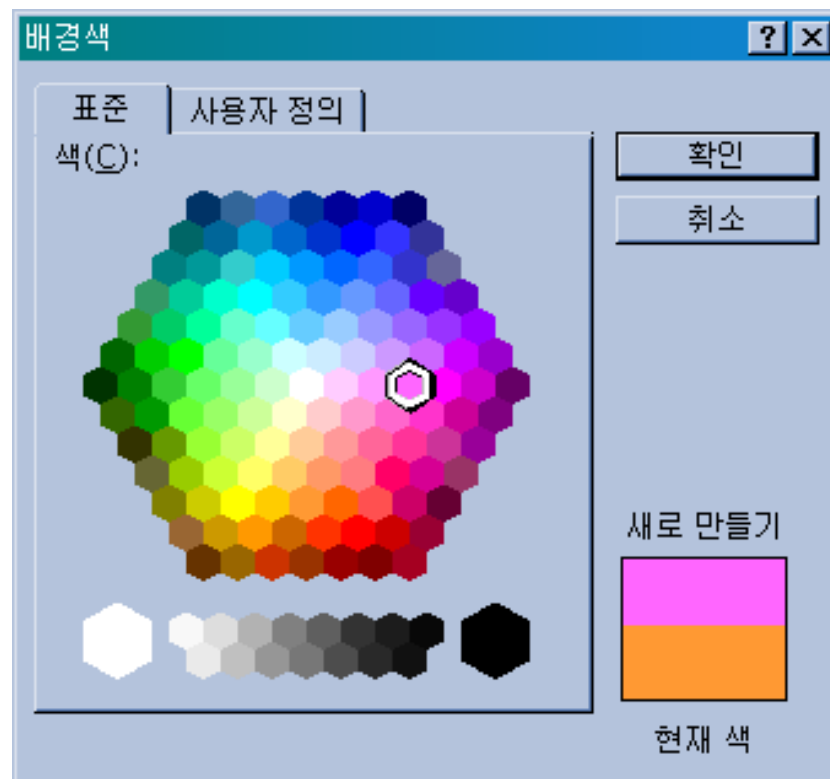
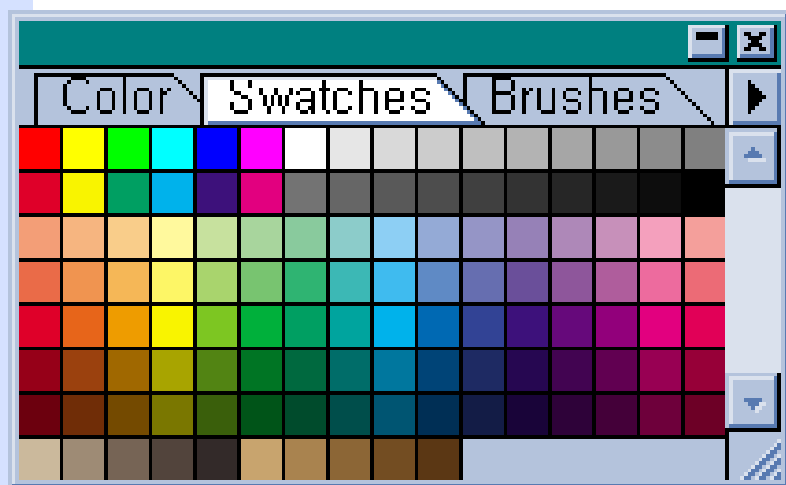


YIQ Color Model

- * YIQ Color Model: illumination changing(o'zgartirish)ga qarab **insonning ko'rish sistemasi** hue(color) yoki saturation bo'lgandagiga qaraganda **yaxshi paydo bo'ladi**
- * **Asosan TV teleko'rsatuvlarda foydalaniladi**
- * Yaxshi tomoni: **Brilliance (ravshanligi)** paydo bo'lganda 'Y' hue(color)ni paydo bo'lgan 'I' yoki 'Q' qaraganda ham **keng band-width(qator)larda ishlatiladi.**
- * Matritsalashgan (matrix) parametridan foydalanganda qarshi tomonini ham **RGB orqali ifodalash imkoniyati**



Palette



Photoshopdagi Palette, Powerpointdagi Palette



Palette

- * **Palette**: Foydalanubchi hohlagan colorni igadigan color table
 - * System Palette, Custom Palette
- * Pixel
 - * Ekranida paydo bo'lga holatda to'rt burchak hamma tomonlarini (perfect square) ko'rsatadi
 - * Outline, diagonal line shaklida bo'lgan holatda background va uni tashqi yuzasini zinapoya(Stairs) shaklida ko'rsatadi
- * **Aliasing**: **Zinapoya shaklini** bo'luvchi boundary line paydo bo'lishini ko'rsatadi
- * **Antialiasing Metod**: Sun'iy bo'lmagan holat bo'lmasligi uchun
 - * Narsa buyum va backgroundning chegarasidagi Pixel narsa buyumning rangi va background rangining o'rtacha qiymatini aniq ko'rsatadigan metod
 - * Imagega texture bo'lganda tushunturishni qo'shganda **text diagonalining line boundary surface uchun** Antialiasingdan metodidan ko'p foydalanadi



Image Processing

* **Image Processing:** Inson tushunish uchun uni Image ma'lumotlari bilan yaxshi almashinishni ifodalash fani

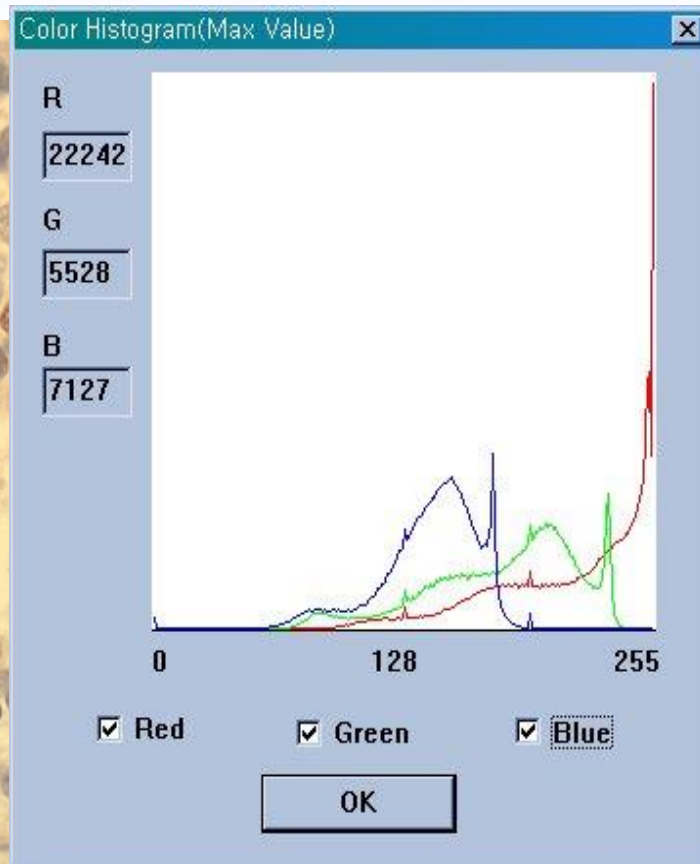
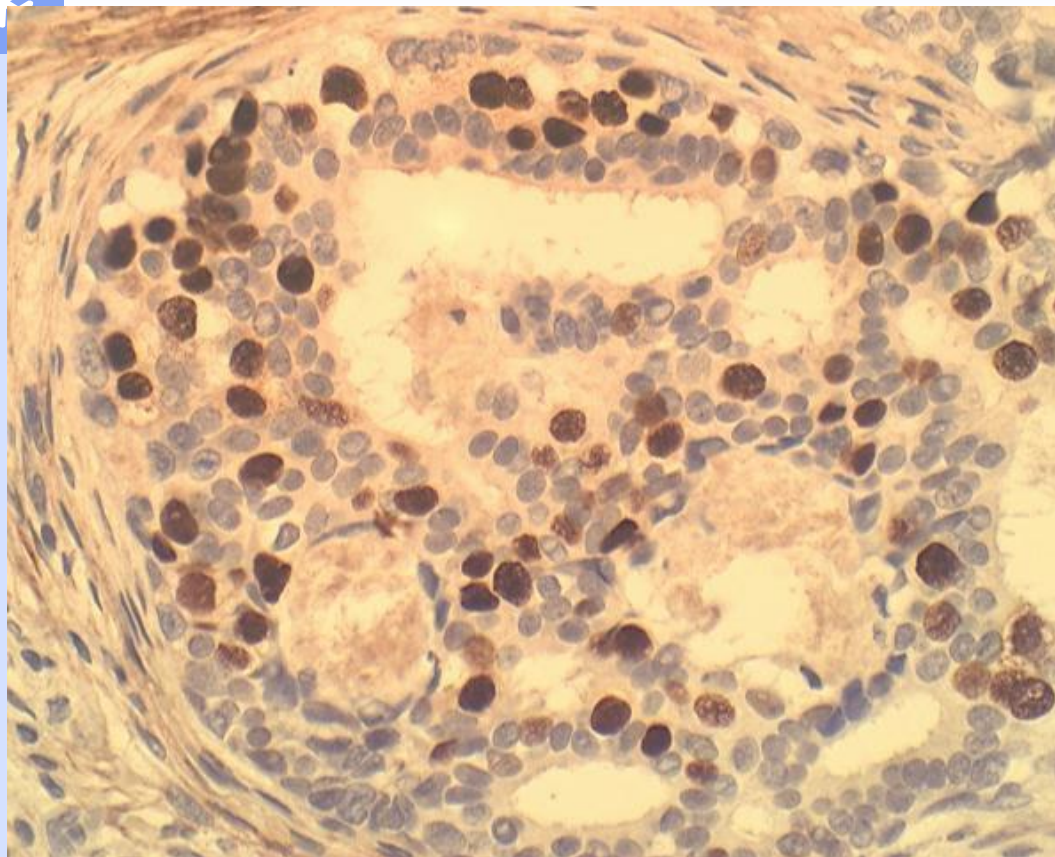
- * Ishlab chiqarish orqali xohlagan Imagalarni oladi
- * Image smoothing qilib blurring (rasm chegaralarini o'chirish) shaklini kamaytirish
- * Ravshan Imageni olish uchun sharpening(aniqlashtirish) filteridan foydalaniladi
- * Image contrastlari darajasini oshirish
- * Harf yoki rasmni qayta tiklash(restoration) imkoniyatlari
- * Image va Imagelar o'rtasida mantiqiy arifmetika(logical arithmetic) bilan qo'shib hisoblash(addition) va subtraction qilish imkoniyatlari
- * Web, video, TV, kino filmlar kabi Multimedia soxasidan turlicha foydalaniladi



Histogram

- * Histogram izohlari:
Imagelarning Pixel qiymatlari bar graph yoki line graph paydo bo'lishini
 - * X axis- pixel qiymati(level), Y axis- pixel soni(count)
- * Graph(grafika)ni ko'rib Thresholdingni o'rnatib(estabilish) **ob'ektini topib oladi**
 - * Hamma Image yoki Block Image
- * Threshold Histogrammani differential eng

Histogram



(a) Immunitet to'qimalarini antibody bo'lishiga qarab ranglar o'zgarishi breast cancer (ko'krak raki) to'qimalari Imagelari, (b) RGB Band (rang qatorlari)ga qarab on'g tomondagi Color Imagelar **Histogrammasi**

Image Filter

Image Filter Processing Imaging shovqinlari(noise) yoki buzilgan qismlarini original Imagelarga o'xshatib qilish jarayoni

Convolutiondan foydalanish

Low Pass Filter(smoothing image uchun), High Pass Filterdan(ravshan image uchun) foydalanish



(a) Original Image (b) Canny edge detection bajargan natiza Image



Image Analysis

Image analysis

Image processingdan olib objectda bo'lgan raqamlashtirib datalarni topib oladigan (extraction) jarayon

- * Objectning shakllashgan xususiyati
- * Ranglar xususiyati
- * Texture xususiyatlarini topib olish (extraction)

* Image segmentation

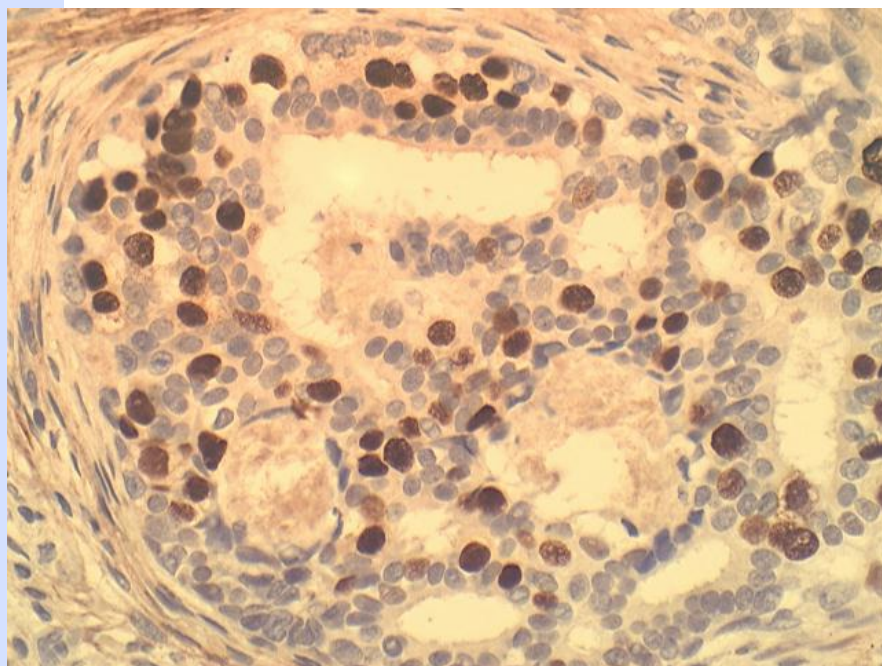
Object ifodalash uchun bo'lgan area(joy)ni topib yoki Objectning birinchi qismini bo'ladi

* Bajarish soxasi

- * Sun'iy yo'ldosh Imagelaridan yerning asosiy geografik ma'lumotlarini analiz qilish
- * Atrof muhitda bo'lgan Imagelarni aniq analiz qilish
- * Industrial zavodlarida noto'g'ri sifatsiz mahsulotlarni topib beradi
- * Medetsina soxasida cell(xujayra) hajmi yoki opuxol(o'sma) hajmi kattaligini aniq analiz qilib beradi



Imagelarni Bo'lish



[5.15 Rasm] (a) Immunitet to'qimalarini antibody bo'lishiga qarab ranglar o'zgarishi breast cancer (ko'krak raki) to'qimalari Imagelari (b) bo'lingan positive cell Image

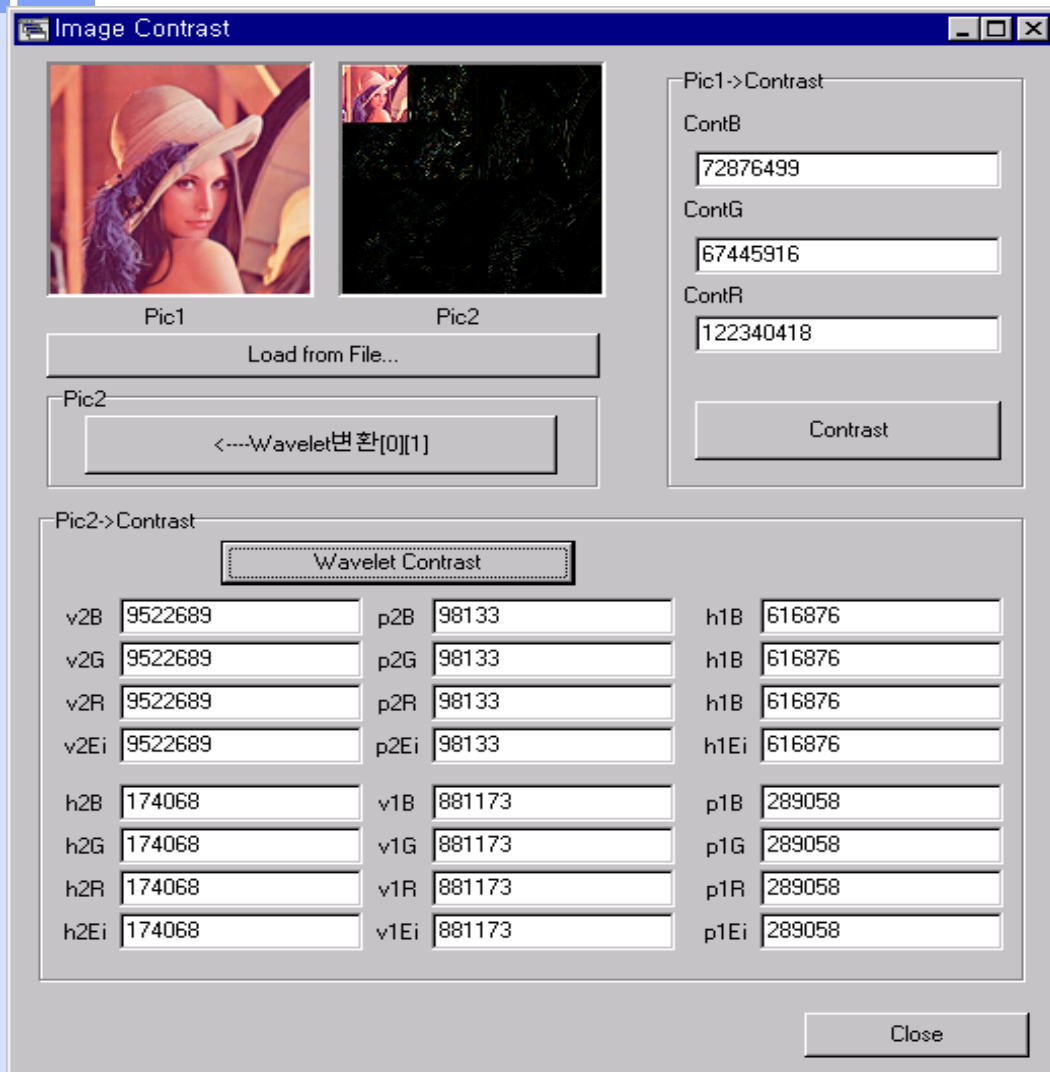


Feature Extraction

(Xususiyatlarni Topib Olish)

- * Objectni aniq bo'lish uchun Object xususiyatlarini olish (Feature Extraction) kerak
- * Xususiyat qiymatlarini qaror qilib aniq barajarib aniq analiz qila oladi
- * 5.16 Rasmda Hue(rang) xususiyat qiymatlarini va Wavelet orqali texture xususiyat qiymatlari bilan topib oldim
- * Xususiyat qiymati Image xususiyatlariga qarab turlaga ajratadi
 - * Binary Imageda aylantirib, kengligini, yarim aylana, uzun koordinata o'qi, kichik koordinata o'qi, object soni
 - * Monocolor Imageda Homogeneity (Bir xillik darajasi), Contrast, Mean(Average), Variance (mos kelmaslik), Kurtosis (kurtosis of frequency curve), Skewness (assimmetriya)
 - * Color Imageda RGB rang band (qator)lariga qarab xususiyat qiymati va rang xususiyat qiymati
- * Area frequencyni o'zgartirish (wavelet transform), Frequency o'zgartirish (fourier transform), Frequencyni o'zgartirayotganda cosinus(Cos.) o'zgartirish (cosine transform) kabilarda foydalanadigan frequency area xususiyat qiymatlarini ham hisoblaydi

Feature Extraction (Xususiyatlarni Topib Olish)



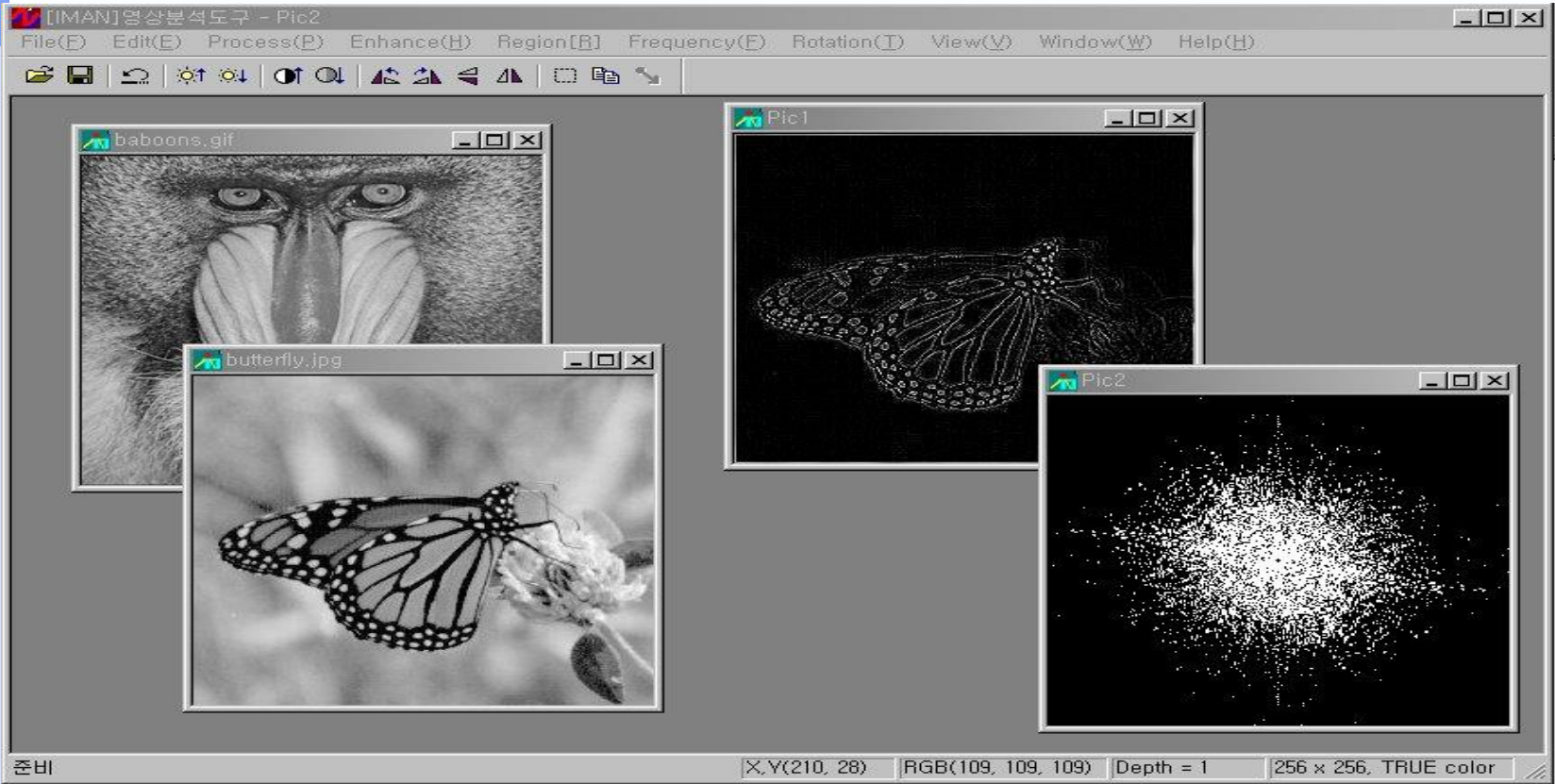
[5.16 Rasm] Rangli
Imaging waveletini
bajargandan keyin har
bir area(joy)da
xususiyatlarsiz topib
oladi



Image Analysis Software

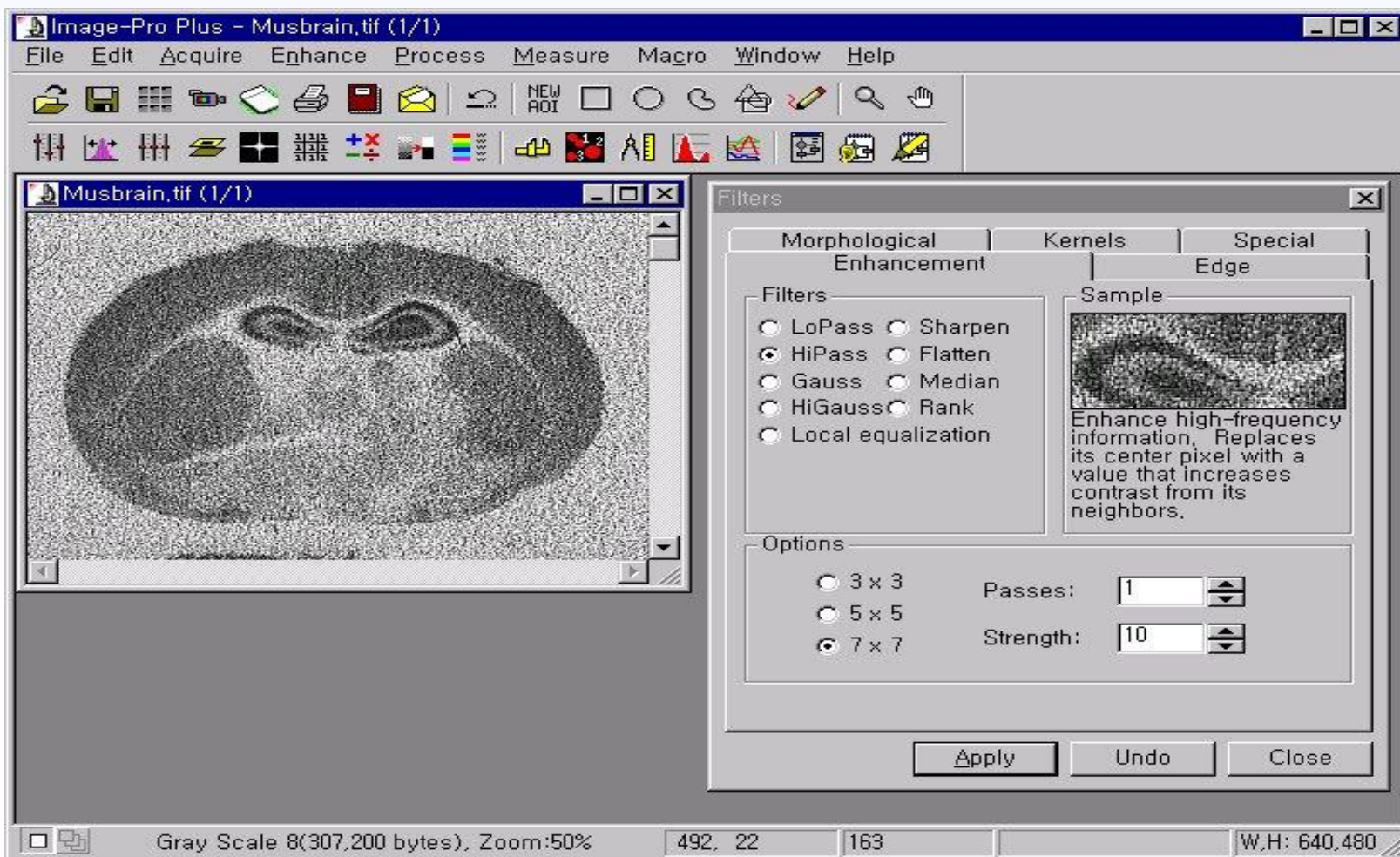
- * Image Restoraion: Buzilgan Image sifatini matematik qonuniyatlar yoki frequency(o'lcham) arealar tushunchalari kabilardan foydalanib shakllantirida va originalini topadi
- * Image sifatining buzilishi sabablari
 - * Imagening eskirishi
 - * motion(harakat) yoki to'siqlar
 - * Linza o'zgaruvchanligi
- 1) Image Analyzer
 - * Imageda mavjud bo'lgan analiz va amalga oshirib beruvchi programma
 - * Kulrang Image va rangli Imageda bo'lgan boshqarish menyusini o'z ichiga oladi
 - * Shakllantirib beruvchi jarayon, nuqta processing va area processing algorithmdan foydalanib uni bajaruvchi natija Imagelarni ko'ra oladi
- 2) Image Pro
 - * Image olish, Image rivojlantirish, Image analiz qilish uchun programma
 - * Image jarayonlari va analiz qilishga bo'lgan turli algoritmlar bilan ta'minlab keng qo'llanadigan S/W

Image Analysis Software



[5.17 Rasm] Image Analyzer - Image Analysis Software

Image Analysis Software



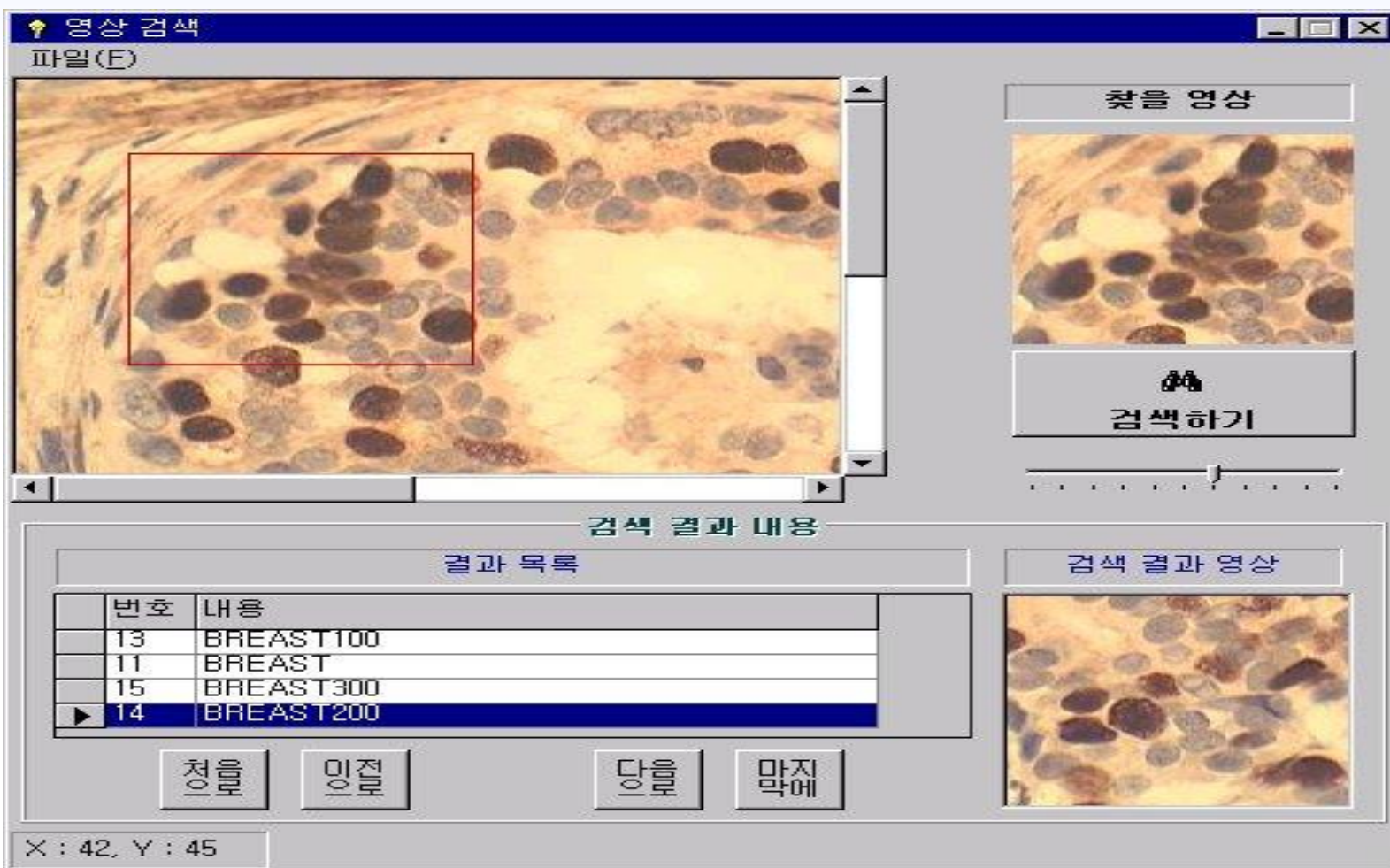
[5.18 Rasm] Image Pro amalga oshirish Ekrani



Image Qidirish

- * Image qidirish: Image databaseda saqlab qo'yib Query (so'roq gaplar)ni berib izlaydi
- * Knowledge based image retrieval system
- * Imagening shakllangan xususiyati, texture qiymati, rang xususiyatlari DBda saqlasak qidirish mumkin.
- * 6.19 Rasm MedITda yasalgan Image qidirish sistemasi bitta Cell strukturasi Imagening Sample(128x128)ni qo'yib Query Imageda teng₃₂ bo'lgan daraja 70 % ortiq bo'lgan Image databasedan boshlab

Image Qidirish



[5.19 Rasm] Image Qidiruvchi Sistema



Image Edit

Rasmga muharrirlik qilish uchun qonuniyat va programma

- * Paintshop yoki Photoshop Program kabilardan foydalanish
- * Qo'lda chizilgan rasm yoki rasmni Scanner qilgan kabilarni input (kirkazish) qilish

* 5.11.1 Image Edit Software

- * Jasc Software firmasining Paint Shop Pro
- * Adobe firmasining Photoshop yoki Illustrator kabi
- * Photoshop
 - * Pixel qiymatini bajarganda Bitmap metodidan foydalaniladi
 - * Zich Image Data jarayonlarini osongina hal qiladi
 - * Qiymati qimmat ba ko'plab memolarni egallaydigan yomon tarafi mavjud
 - * Rang turi RGB modedidan foydalanadi
 - * Imageda edit mavjud bo'lib filtering funksiyasini yaxhsilaydi
 - * 3D Graphic Mapping Source vazifasi moslashtiradi

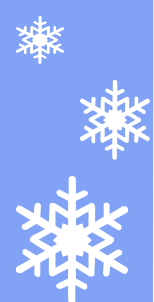


Image Edit



[5.20 Rasm] Photoshop amalga oshirilgan ekran