FULL BOOK NOTES

📄 PYTHON CLASS XI NOTES (ENGLISH + HINGLISH EXAMPLES)

📂 Chapter 1: Computer System Overview

✅ 1. What is a Computer System?

A computer system is a group of physical and software components that work together to input, process, store, and output data.

✏️ **Hinglish:** Computer system ek aisi vyavastha hoti hai jo hardware aur software ke sath milkar data ko process karti hai.

✅ 2. Components of a Computer System

- **Hardware:** Physical parts of the computer (monitor, keyboard, CPU)
- **Software:** Set of instructions/programs that run the computer
    - **System Software:** Operating system (e.g., Windows, Linux)
    - **Application Software:** MS Word, Tally, Browsers
    - **Utility Software:** Antivirus, Disk Cleanup
    - **Customized Software:** Banaya gaya software kisi specific kaam ke liye (e.g., billing software for shops)

✅ 3. CPU (Central Processing Unit)

- **CU (Control Unit):** Controls flow of data and instructions
- **ALU (Arithmetic Logic Unit):** Performs math & logical operations

✏️ **Hinglish:**

- CU: Computer ki har activity ko control karta hai
- ALU: Calculation (Ganit) aur decision (Tark) ka kaam karta hai

✅ 4. Memory Types

- **RAM (Random Access Memory):** Temporary memory, gets erased when computer shuts down
- **ROM (Read Only Memory):** Permanent memory, stores startup instructions
- **Cache Memory:** Fast memory close to CPU for quick access
- **Flash Memory:** Portable storage (e.g., pen drives, SSD)

✅ 5. Registers

Registers are small, fast memory units inside the CPU used to store temporary data during processing.

✏ **Hinglish:** Register CPU ke andar hoti hai aur ye bahut fast hoti hai. Ye calculation ke waqt temporary data ko store karti hai.

📄 Chapter 1: Practice Questions with Answers

✳ MCQs:

1. Which of the following is NOT an input device?
   a) Mouse
   b) Keyboard
   c) Monitor
   d) Scanner
   ✅ **Answer:** c) Monitor (It's an output device)
2. Which memory is used to store data temporarily?
   a) ROM
   b) RAM
   c) Hard Disk
   d) SSD
   ✅ **Answer:** b) RAM
3. Which software controls overall working of computer?
   a) Application software
   b) System software
   c) Utility software
   d) Customized software
   ✅ **Answer:** b) System software
4. ALU stands for:
   a) Arithmetic Logical Utility
   b) Arithmetic Logic Unit
   c) Array Logic Unit
   d) Algorithmic Logic Unit
   ✅ **Answer:** b) Arithmetic Logic Unit

✳ Fill in the Blanks:

1. CPU stands for _____

   ✓ **Answer:** Central Processing Unit

2. Temporary memory in a computer is called _____

   ✓ **Answer:** RAM

3. A _____ is used to convert high-level language into machine code.

   ✓ **Answer:** Compiler

4. Permanent memory is _____

   ✓ **Answer:** ROM

✳ Assertion & Reasoning:

1. **Assertion (A):** RAM is a volatile memory.
   Reason (R): RAM loses data when power is switched off.
   ✓ **Answer:** Both A and R are true, and R is the correct explanation.

🗁 Chapter 2: Data Representation (Deep Explanation)

✓ Number Systems

Number System	Base	Digits Used
Binary	2	0, 1
Octal	8	0 to 7
Decimal	10	0 to 9
Hexadecimal	16	0 to 9 and A to F

✓ What is Binary?

- Used by computers
- Base-2 system with only 0 and 1

✏ **Hinglish:** Computer sirf 0 aur 1 samajhta hai. Isiliye binary system ka use hota hai.

✓ What is Decimal?

- Number system we use in daily life
- Base 10 (0 to 9 digits)

✏ **Hinglish:** Hamari daily life mein jo ginti hoti hai, wo decimal hoti hai jisme 0 se 9 tak ke digits hote hain.

✅ What is Hexadecimal (Hex)?

- Base 16 number system
- Uses digits: 0 to 9 and A to F (where A=10, B=11,...F=15)
- More compact than binary — used in programming, memory addresses, color codes

✏ **Hinglish:** Hexadecimal ek number system hai jiska base 16 hota hai. Isme 0-9 ke saath A-F letters use hote hain. A = 10, B = 11, ..., F = 15.

Example:

```
0x2A = (2 × 16) + 10 = 42 (Decimal)
```

✅ What is Unicode?

Unicode is a character encoding standard that gives a **unique code number to every character** in every language of the world.

✏ **Hinglish:** Unicode ek aisa system hai jo har language ke har character ko ek alag (unique) number deta hai. Isse har script ko computer samajh sakta hai.

✅ What is UTF (Unicode Transformation Format)?

UTF is a way to **store Unicode characters in memory** using bytes.

◆ **Types of UTF:**

- **UTF-8:** 1 to 4 bytes (most common on the web)
- **UTF-16:** 2 or 4 bytes
- **UTF-32:** Always 4 bytes

Why UTF is important?
Because computers work with bytes (binary), UTF helps in converting and storing text in a way that computers can handle.

✏ **Hinglish:** Computer to sirf binary samajhta hai, isliye UTF ka use hota hai taaki text ko binary mein convert kar ke store kiya ja sake.

✅ ASCII vs Unicode

Feature	ASCII	Unicode
Characters	English only	All global languages
Size	7-bit or 8-bit	8, 16, or 32-bit (UTF formats)
Total characters	128 (or 256)	Over 1,00,000

🔥 ASCII vs Unicode — Full Deep Explanation (Book Style)

✅ ASCII Kya Hai? (What is ASCII?)

ASCII ka full form hai:
American **S**tandard **C**ode for **I**nformation **I**nterchange.

📌 ASCII Bana Kyun?

Pehle ke computer sirf **English language** ke characters (A to Z, 0 to 9, symbols jaise `@`, `#`, `%`, etc.) hi samajh paate the. Har character ko ek number diya gaya — isse bolte hain **encoding**.

✅ Example:

Character	ASCII Code
A	65
B	66
a	97
1	49

❌ Limitation of ASCII:

ASCII sirf **128 ya 256 characters** tak support karta tha.
⚠ **Lekin problem ye hui**:

- Hindi, Urdu, Tamil, Chinese, Arabic jaise languages ke characters isme nahi the.
- Emoji bhi nahi the.

❌ **Conclusion:** ASCII sirf English ke liye theek tha — duniya ke liye nahi.

✅ Unicode Kya Hai? (What is Unicode?)

Unicode ek **global standard** hai jisme **duniya ki har language ke har character** ko ek **unique number (code)** diya jata hai.

📌 **Unicode bana isliye**:

- Taaki Hindi, Chinese, Arabic, Tamil, Korean, Emoji, Math Symbols — **sab kuch computer samajh sake**.
- Ek hi file mein multiple languages likh sako — without confusion.

✅ Unicode Kaise Kaam Karta Hai?

Unicode har character ko ek **number** deta hai, jaise:

Character	Unicode
अ	U+0905
你	U+4F60
😀	U+1F600

Ye numbers computer ke liye readable hote hain jab wo encode kiye jayein using UTF (Unicode Transformation Format).

✅ UTF Kya Hai? (UTF-8, UTF-16, UTF-32)

Jab Unicode ke characters ko **binary mein store karna hota hai**, tab use hota hai **UTF**.

🔠 Types of UTF:

Format	Bytes per Character	Use Case
UTF-8	1 to 4 bytes	Most common, Internet-friendly
UTF-16	2 or 4 bytes	For software like Windows, Java
UTF-32	Fixed 4 bytes	High precision but large size

🗣️ **Hinglish:**
Computer ko sirf 0 aur 1 samajhte hain — isliye character ko binary banana padta hai.
UTF ka kaam hai: **Unicode number ko computer ke samajhne layak binary mein convert karna.**

💡 Real Life Example:

Agar tu ek website bana raha hai jisme Hindi, English aur Emoji sab likhna hai:

- **ASCII use karega to sirf English dikhega**
- **Unicode (UTF-8) use karega to sab language aur emoji sahi dikhenge**

📄 For example:

```
<meta charset="UTF-8">
```

Ye line har webpage mein hoti hai — taaki browser Unicode encoding use kare.

✅ Summary Table:

Feature	ASCII	Unicode
Characters	English only	All Languages + Emoji
Bit Size	7-bit or 8-bit	8, 16, 32-bit (UTF-8, UTF-16, UTF-32)
Max Characters	128 (Extended: 256)	Over 1,00,000+
Languages Supported	1 (English)	100+ (including Hindi, Urdu, Tamil...)
Emoji Supported	❌ No	✅ Yes
Use Today?	❌ Rare	✅ Used everywhere (web, mobile, apps)

🧠 Memory Note:

Character	ASCII Size	UTF-8 Size
'A'	1 byte	1 byte
'अ'	❌ Not supported	3 bytes
'😀'	❌ Not supported	4 bytes

🔚 Final Thoughts:

🧓 ASCII = Purana zamana (sirf English)
🌍 Unicode + UTF = Naya jamana (sab language, emoji, color code, safe)

Isiliye aaj har programming language, website, app — **Unicode UTF-8** ka use karti hai.

✅ Python Conversion Examples:

```
# Decimal to Binary
print(bin(10))    # Output: 0b1010
```

 Why `0b` appears?

- It means the value is in **binary** format.
- Prefixes:
  - `0b` = binary
  - `0o` = octal
  - `0x` = hexadecimal

```
# Other conversions:
print(oct(10))     # 0o12
print(hex(10))     # 0xa
print(int("1010", 2))   # Binary to Decimal = 10
print(int("2C", 16))    # Hex to Decimal = 44
```

Hinglish Examples:

- `0b1010` = 10 (Binary)
- `0x2C` = 44 (Hex)

Chapter 2: Practice Questions with Answers

✳ MCQs:

1. Which number system uses only 0 and 1?
   a) Decimal
   b) Binary
   c) Octal
   d) Hexadecimal
   ✅ **Answer:** b) Binary
2. What is the base of hexadecimal number system?
   a) 2
   b) 8
   c) 10

d) 16

✓ **Answer:** d) 16

3. Unicode helps in:
   a) Compression of files
   b) Faster internet speed
   c) Representing text in all languages
   d) Converting text to image
   ✓ **Answer:** c) Representing text in all languages
4. What is the prefix used for binary numbers in Python?
   a) 0d
   b) 0b
   c) 0x
   d) 0c
   ✓ **Answer:** b) 0b

✳ Fill in the Blanks:

1. Hexadecimal uses letters from _____ to represent numbers 10 to 15.
   ✓ **Answer:** A to F
2. Binary number system has base _____
   ✓ **Answer:** 2
3. In Python, the prefix for hexadecimal is _____
   ✓ **Answer:** 0x
4. Unicode assigns a _____ code to each character.
   ✓ **Answer:** unique

✳ Assertion & Reasoning:

1. **Assertion (A):** UTF-8 can store characters using variable number of bytes.
   Reason (R): UTF-8 uses 1 to 4 bytes depending on character.
   ✓ **Answer:** Both A and R are true, and R is the correct explanation.

✓ **Next Step:** Chapter 3 notes + practice coming next!