DATA TYPES, ASSIGNMENT AND I/O STATEMENTS

4. In how many modes, GW-BASIC can operate? Discuss briefly.
Ans: GW-BASIC can operate in two modes i.e., **Direct Mode** and **Indirect Mode**.
Direct Mode: When GW-BASIC is loaded, it shows *Ok* message indicating the **direct mode**. Commands are executed as typed. It is useful for quick response. Direct mode can also be used as calculator.
Indirect Mode: You can start this mode by using **AUTO** command. Indirect mode is used to type programs {set of instructions}. Program statement always starts with **line numbers 10, 20**..etc. **RUN** command is used to get the output.

5. Describe rules of naming variable in GW-BASIC.
1. A *Variable Name* cannot be more than 40 characters. E.g : MarksInEnglish = 80
2. The *Variable Name* may contain alphabets, numbers and the decimal point. E.g. EM.R1=90, EM.R2=20
3. The first character of *Variable Name* must be an alphabet.
4. Reserved words can't be used as *Variable Name*.
5. Blank spaces are not allowed in *Variable Name*.
6. The last character of *Variable Name* may be a special type declaration. Like $, %, !, # (see Page-18)

6. What are type declaration characters? Explain their uses with examples.
Ans: Type declaration characters are $, %, ! and #. (Dollar, Exclamation and Hash sign)
Uses & Examples:
- $ Sign is used to declare *string variable*. Exp. NNAME$ = "Adnan"
- % sign is used to declare *integer variable*. It takes 2 bytes to store value. E.g. **Marks% = 960**
- ! sign is used to declare *single-precision variable*. It takes 4 bytes to store value. E.g. **Avg! = 23.09**
- # sign is used to declare *double-precision variable*. It needs 8 bytes to hold value. Eg.**Area#** =84.53521343

7. Briefly describe the uses of arithmetic, logical, and relational operators.
Arithmetic operators are +, -, *, / which are used to perform arithmetic operations. Like a+b, 9/3 etc.
Logical operators are **NOT, AND, OR**, which are used to combine simple condition. Like IF A > B **AND** A>C
Relational operators are =, <, >, <=, >=, and < > (not equal to) which are used to compare two values. IF A>B

8. What does it mean by type conversion? Describe rules of type conversion in BASIC.
It means the conversion of one type of data to another type during arithmetic operation.

Rule 1. If *numeric constant* is assigned to different type of *numeric variable*, the number is converted according to the type of the **variable**. eg: **LET x% = 51.39**. (x% stores only integer i.e. **51**, & Ignores **.39**)

Rule2: During evaluation of an expression, all **operands** are converted to the **degree of precision**.
e.g. A# = 12# /13, A# = 0.9230769230769231 (# sign is for Double-precision, It takes 8 bytes).

Rule3: When a **floating-point value** is assigned to **integer variable**, then **fractional part** is rounded.
E.g. **num%=23.67, num% = 24. (%** sing is for Integer Variable, it takes 2 bytes)

9. Write a program to read ten VALUES **specified in DATA statement, and display the sum of these values on the screen.**
```
10 READ V1, V2, V3, V4, V5, V6, V7, V8, V9, V10
20 SUM = V1+ V2+ V3+ V4+ V5+ V6+ V7+ V8+ V9+ V10
30 PRINT SUM
40 DATA 7, 4, 3, 1, 2, 9, 8, 7, 12, 10
50 END
```

10. Ans.: Answer the following short questions:
i). **Write the purpose of the function keys i.e., from F1 TO F9 in GWBASIC.**

F1	LIST	Used to see the list of program.
F2	RUN	Used to execute the program
F3	LOAD	Used to load program into RAM from Disk
F4	SAVE	Used to save program into the Disk.
F5	CONT	Continue scrolling if it is temporarily paused.
F6	LPT1	Used to connect computer on Local Printer port.
F7	TRON	Shows line numbers while executing the program.
F8	TROFF	It turns off *TRACE ON* function.
F9	KEY	It displays/hide key on the screen. E.g. **KEY ON** or **KEY OFF**

ii). **What does IDE stand for? Discuss features of GW-BASIC IDE.**
Ans: IDE stands for *Integrated Development Environment*.
Features: We can write, edit, save, load and execute programs very easily in GW- Basic environment. As it is High Level Language, easy to learn and program. It is basically made for the beginners (students).

iii). Explain the term 'Loading a Program'. Why should a program be loaded before execution?
Ans: It means to load your saved program into RAM so that you can execute your program. Program will not execute if it is not loaded into RAM before execution.

iv). Differentiate BASIC commands and statements?
Ans: Commands: Mostly commands are used in **direct mode** to manage the program like LIST, SAVE etc.
Statements: Statements are used in **indirect mode** to write program e.g. FOR… NEXT, INPUT etc.

v). What is the difference between CLEAR command and CLS command?
Ans: Clear: closes all opened files and sets all **Numeric or String variables** to zero/Null (Nothing).
CLS: This command is used to clear the screen.

vi). Write the purpose and syntax of the following commands: LIST, AUTO, PRINT,SAVE, LOAD,
Ans: See Book Page No. 19 to 29 (Basic Commands). IF..THEN…ELSE, FOR..NEXT, WHILE ..WEND etc

vii). Briefly describe the structure of a BASIC program.
Ans: Basic program always begins with line numbers like 10, 20, 30. After writing each statement **Enter** button is pressed. Normally single statement is written on single line, END statement is used to finish program.

viii). Differentiate variable and constant.
Ans: Variables are named memory locations, which are used to store input data. The value of variable may change during the execution of program. Its default value is zero/Null (nothing). There are two types of variables *Numeric variable* and *String variable*. E.g. *N=15*, *N$ = "PIPS"*
Constant: A constant is a quantity whose value cannot be changed. There are two types of constants *Numeric constant* and *String Constant*. E.g. *123*, *"PIPS"*

ix). Write a program that asks for the name, roll number, class, section and marks in different subjects of a student of class 10. The program should calculate and display total marks and percentage of the student. Total marks are 850.

10 CLS	90 INPUT "Enter Eng Marks(150). "; Eng
20 INPUT " Enter Name"; N$	100 INPUT "Enter Urdu Marks(150)"; Urd
30 INPUT "Enter Roll No."; RN	110 INPUT "Enter Isl Marks(75)"; Is
40 INPUT "Enter Class & Section "; CS	120 INPUT "Enter P-Std Marks(75)"; Pst
50 INPUT "Enter Comp Marks (100)"; Com	130 TMO= Com+ Ph+ Ch+ Mat+ Eng+ Urd+Is+Pst
60 INPUT "Enter Phy Marks (100)"; Ph	140 PM = (TMO * 100) / 850
70 INPUT "Enter Chem Marks(100)"; Ch	150 PRINT "Total Marks Obtained= " TMO
80 INPUT "Enter Math Marks(100)"; Mat	160 PRINT "Percentage Marks= " PM

x). Write a program to calculate distance covered by a car moving at an average speed of *v* ms^{-1} in time *t* . The program should input average speed and time.

```
10 INPUT " Enter Average Speed"; V
20 INPUT "Enter Time"; T
30 S = V * T
40 PRINT " Distance Covered = " S
50 END
```

xi). Give an example to explain the use of comma (,) and semi colon (;) with PRINT statement.
Comma: With PRINT statement, comma gives output across the screen zones.
Semicolon: PRINT the strings without adding spaces.

```
10 A$=SINDH": B$="PUNJAB": C$="BALOCHISTAN": D$="NWFP": E$="KASHMIR"
20 PRINT A$; B$; C$; D$; E$
30 PRINT: PRINT A$, B$, C$, D$, E$
50 END
```

11. Write a program to calculate the volume of a cylinder. [Volume = 3.14 × radius × radius ×height]

```
10 INPUT " ENTER RADIUS"; R
20 INPUT "ENTER HEIGHT"; H
30 PRINT " VOLUME = " 3.14 * R * H
40 END
```

12. Write a program to compute the square of any given number using INPUT statement.

```
10 INPUT "ENTER ANY NUMBER"; N
20 PRINT " SQURE =" N ^ 2
30 END
```

13. Write a program to print the sum and average of three numbers using LET statement.

10 CLS	10 CLS (Q. 14)
20 LET A=5: LET B = 10: LET C = 4	20 LET A=5 : B= 10 : C = 20
30 PRINT " SUM =" A + B + C	30 SUM = A + B + C
40 PRINT "AVERAGE= " (A+B+C)/3	40 PER = SUM/3
50 END	50 PRINT "TOTAL =" SUM "PERCENTAGE =" PER