

Chapter No 2

Data types, Assignment and Input/Output Statements

Q.No.1-Write a short note on Basic?

Basic is a high level language. It stands for Beginner's All Purpose Symbolic Instruction Code. The basic language was developed by John Kemeny and Thomas Kurtz in 1963 at Dartmouth college USA. Basic language was invented to teach fundamental programming concepts to students. Older languages were difficult to use but basic language is easier for programming.

Q.No.2-In how many modes GW-Basic can operate? Discuss briefly?

GW Basic operates in 2 modes

- 1- Direct mode
- 2- Indirect mode

Direct Mode

In direct mode, GW-Basic commands are executed as they are typed. Results of arithmetic and logical operations can be displayed immediately but the commands are lost after execution. This mode is useful for debugging and for quick computations.

Indirect mode

The indirect mode is used to type programs. Statements are always preceded by line numbers and are stored in memory. The program loaded in memory is executed by entering the run command.

Q.No.3-What does IDE stand for? Discuss different features of GW-Basic IDE.

IDE stands for Integrated Development Environment. GW-Basic provides IDE. Due to IDE, we can write programs, we can save programs; we can edit and load programs. Due to IDE, we can update and execute our program.

Q.No.4-What is syntax of instructions in any program? What are rules of line number?

A general syntax of any instruction in a program is,

Line# statement(s)

Here line# is specific line number and after it there is statement or statements.

- 1- Line number must be in the range of 0 to 65529
- 2- Any program line can not have more than 255 characters.
- 3- There may be more than 1 statement in a line separated by colon.
- 4- The program statements are executed in ascending order.

Q.No.5- Differentiate Basic commands and statements?

Commands	Statements
1- GW-Basic commands are executed as they typed.	1- Statements are instructions which are written in the program and w take output after run the program
2- Commands are operated in direct mode.	2- Statements are written in indire mode.
3- Command does not require any line number.	3- Every statement is preceded by line number.

Q.No.6- Write down structure of a basic program?

Structure of BASIC Program is,

- 1- Every program statement must begin with a line number
- 2- End very BASIC program with END statement
- 3- Repetition of line numbers within a program is not allowed
- 4- Two or more statements can be written on a line but they must be separate a colon
- 5- In BASIC, Variables can be used without declaration.
- 6- The program statements will always execute according to the ascending c

Q.No.7-What will happen if we reuse any line number in same program?

Reuse of an existing line number causes all of the information contained original line to be lost.

Q.No.8-Why we save any program? Write a method to save program?

In order to use the Program in future, we must SAVE it. To save a file in GW BASIC, the following procedure is used

- 1- Press the F4 key or type SAVE Command.
- 2- Type a Valid name (in quotes) for the program, and press the ENTER key.

Q.No.9-What is meant by loading the program? Why should the program be loaded before execution?

Loading the program means to bring it into memory from secondary storage device. It is necessary to load a program before execution to make it ready for use

Q.No.10-How a program can be loaded?

A program can be loaded by the following procedure.

- 1- Press the F3 key or type load command
- 2- Type the name of an existing file
- 3- Press Enter

Q.No.11-What is extension of basic program?

The extension of GW basic program is bas

Q.No.12-If invalid path or file name is typed after load command then what will happen?

If invalid filename or path is type with load command then an error message displayed.

Q.No.13-What is meant by execution of a program? How we can execute a program?

Execution means to carry out instruction of a program. Program must be loaded before execution. To execute a program, Press F2 key or type run command.

Q.No.14-What is meant by reserved words?

Reserved word or key words have some special meanings in basic program and they can not be used for any other purpose, e.g. Run, while go to, print, list etc key words cannot be used as a variable.

Q.No.15-Write the purpose of function keys F1 to F9?

Keys	Function	Purpose
F1	List	To view the list of program instruction
F2	Run	To execute a program
F3	Load	To load a program from hard disk to memory
F4	Save	To save a program in hard disk
F5	Cont	To continue the execution after statement
F6	LPT-1	To print the output of a program
F7	TRON	To view line number during execution of program
F8	TROFF	To terminate the TRON function
F9	KEY	To print keys with Functions

Q.No.16-If no value is assigned to variable then what will be its value?

If a variable is assigned no value, the GW Basic assumes the value of variable to be zero in case of numeric variables and null in case of string variables.

Q.No.17-Define variable and discuss its types?

Variable:-

Variables are named memory locations (memory cells) which are used to store programs' input data and its computation results during program execution.

There are two types of variables

- 1- Numeric variable
- 2- String variable

Numeric Variable

Numeric variables can store numeric values. If the type of numeric variable is specified then GW Basic considers it as single-precision.

For example,

A = 22222

Total = 556

In these examples, A and Total are numeric variables.

String Variables

String variables can store a sequence of characters. A\$ sign is used with every string variable. We cannot perform any arithmetic operations on string variables.

For example,

A\$ = "Pakistan"

F\$ = "0315-6669514"

In these examples A\$ and F\$ are string variables because there are sequence of instructions are stored.

Q.No.16-Write down rules for naming variables in GW Basic?

There are some rules for naming variables

- 1- In GW-Basic a variable name can not be more than 40 characters long
- 2- The variable name may contain alphabets, numbers and the decimal point.
- 3- The first character in the variable must be an alphabet
- 4- Reserved word's can't be used as variable
- 5- Blank spaces are not allowed in variable names
- 6- The last character of a variable name may be special type declaration character indicating the type of a variable.

Q.No.17.What are the uses of type declaration characters with variables?

In GW BASIC, type declaration characters represent the type of variable. Following type declaration characters are recognized in GW BASIC.

Character	Type of Variable	Example	Memory Required
\$	String variable	Name \$	String length
%	Integer Variable	Marks %	2 Bytes
!	Single precision variable	Avg !	4 Bytes
#	Double precision variable	Area #	8 Bytes

Q.No.18-What are constants? Discuss its different types?

Constant:

Constant is a quantity which can not be change. Constant remains same during execution of a program.

There are two types of constant.

I- Numeric Constant

II- String Constant

Numeric Constant

Numeric constant consists of integers, single precision or double precision numbers. Integer constants represent values that are counted and do not have fractional part. 56, -678, 8.

String Constants

A string constant is a sequence of alphanumeric characters enclosed in double quotation marks. The maximum length of a string constant is 255 characters. For example, "Lahore," "4900", "I Love Pakistan" etc.

Basic Commands

AUTO Command:-

This command automatically generates line numbers in an increasing order each time the ENTER key is pressed.

Syntax

AUTO [line number][,[increment]]

Examples

AUTO 100;20

Generates line numbers 100,120,140 and so on.

ATUO

Generates line numbers 10,20,30,40 and so on

CLS Command:-

This command is used to clear the screen

Syntax

CLS (n)

here n is optional and value of n is 0,1 or 2. Which are describe below,

value of n

Effects

0

Clears the screen of all text and graphics

1

Clears only the graphics

2

Clears only the text

CLEAR Command:-

This command sets the value of all numeric variables to zero and the value of string variables to null.

Syntax

Clear

DELETE Command:-

This command is used to delete program lines or line ranges of loaded program.

Syntax

Delete [line number] [line no 2]

Delete [line number]

Example

Delete 70

Deletes line 70

Deletes 50-150

Deletes lines 50 through 150

Delete -80

Delete all lines from start up to including line 80

Delete 120-

Delete all lines from line 120 to end of the program

KILL Command

This command is used to remove / delete a file from the disk.

Syntax

KILL Filename

Examples

KILL "Inventory bas"

Deletes the file inventory.bas in the current directory.

MKDIR Command:-

This command is used to create a subdirectory

Syntax

MKDIR Pathname

Example

MKDIR "D:/Goods/Inventory"

(Creates the subdirectory Inventory within the directory of

EDIT Command:-

This command is used to modify a program line.

Syntax

EDIT line number

Examples

EDIT 140

Displays program line number 140 for editing

EDIT

Displays the current program line for editing

FILES Command:-

This command is used to list the names of all files residing on the specified drive.

Syntax

Files [Path name]

Examples

Files

Lists all files in the current directory of the selected drive

Files "D:*.*"

List all files on the drive with any extension.

Files "*.doc"

Lists all files whose extension is doc

LIST Command

This command is used to display a loaded program

Syntax

LIST [line number1]-[line number2]

Examples:

LIST

List all lines in the program

LIST -20

List lines of the program up to the line number 20

LIST 10 - 200

List lines from 10 to 200

LIST 20

List lines 20 through the end of the program

LOAD Command:-

This command loads a file from disk to memory.

Syntax

LOAD filename

Example:

LOAD "fact.bas"

Loads the file named fact. Bas

NAME Command:-

This command is used to rename a file

Syntax

NAME old-filename AS new-filename

Example

NAME "Remarks.doc" AS "RMKS.doc"

Gives the name RMKS.doc to the file Remarks.doc

RENUM Command:-

This command is used to renumber the program lines.

Syntax

RENUM [new number],[old number][increment]

Examples

RENUM

Assign new number to the whole program

RENUM 150,70,50

Assign new numbers to lines from 70 to the end of the program such that the new sequence will start from 150 and an increment of 50 is made for each next line.

RMDIR Command:-

This command is used to remove / delete a directory from the disk

Syntax

RMDIR Pathname

Example

RMDIR "D:/GOODS/INVENTORY"

Deletes the subdirectory INVENTORY of the directory GOODS.

SYSTEM Command:-

This command is used to exit from GW BASIC and return to operating system environment.

Syntax

SYSTEM

RUN Command:-

This command is used to execute the program currently in memory. If program is not in the memory, it first load and then run it.

Syntax

RUN file name

Example

RUN "table. Bas"

Executes table. as

SAVE Command:-

This command is used to save the program on the disk for later use.

Syntax

SAVE file name , [a]

SAVE filename , [p]

If the option [a] is specified, the file is saved in ASCII format. The option [p] saves the file in an encoded binary format (protected format)

Examples

SAVE "matrix.bas",

Saves the file matrix.bas in ASCII format

LLIST Command:-

This command is used to list all or part of the program currently in memory to the printer

Syntax

LLIST [line number]-[line number]

LLIST [line number-]

Examples

LLIST

List all lines on the paper of printer

LLIST -20

List lines up to the line number 20 on the paper of printer

LLIST 10 - 200

List lines from 10 to 200 on the paper of printer

LLIST 20-

List lines 20 through the end of the program on the paper of printer

LPRINT Command:-

This command is used to print data at the printer.

Syntax

LPRINT [list of expressions] [;]

CONT Command:-

This command is used to continue program execution after a break.

Syntax

CONT

Q.No.19-What is the difference between clear and CLS command?

Clear	CLS
1-Clear is used to set the values of variables to zero	1-CLS command is used to clear the screen
2-Clear command is used for both numeric and string variable	2-CLS command is used for text and graphics

BASIC Statements

END Statement:-

This statement is used to terminate program execution, close all files and return to the command level

Syntax

END

REM statement:-

This is a non-executable statement and is used to add explanatory remarks in the program.

Syntax

REM [remarks]

STOP Statement:-

This statement is used to terminate program execution temporarily, and return to command level

Syntax

Stop

Q.No.20-What is the difference between stop and End statement?

STOP	END
Stop statement is used any where in program	End is used at end of program
When stop statement is executed, a message is printed "Break In Line Number"	End statement ends the execution of a program
Stop Does not close file	End close the file

Q.No.21- What is meant by Operators in Basic?

Operators in Basic

Operators are symbols which are used to perform certain operation on data. These include arithmetic, relational, logical, and assignment operators.

Q.No.22 Discuss briefly uses of arithmetic, relational and logical operators?

Relational Operators

Relational Operators are used to compare two values. There are six basic relational Operators

Equal to (comparison)	=
Less than	<
Greater Than	>
Less than or equal to	<=
Greater than or Equal to	>=
Not Equal to	<>

Logical Operators

There are three basic logical operators in BASIC. These are AND, OR, a NOT.

The first logical operator i.e., AND When combines two conditions, evaluate to true if both the conditions are true, otherwise, it evaluates to false. The second logical operator OR when combines two conditions, evaluates to true if any one the condition is true, other wise evaluates to false. Similarly, the third logical operator NOT when applied to a condition, reverse the result of the evaluation.

Arithmetic Operators

Arithmetic Operators are used to perform arithmetic operations on value (numbers). The GW BASIC defines the following standard arithmetic operators.

Operation	Symbol	BASIC Expression
Addition	+	a + b
Subtraction	-	a - b
Multiplication	*	a * b
Division	/	a/b
Exponent	^	a^n
Negation	-	-a
Modulus	MOD	aMODb
Integral Division	\	a\b

Q.NO.23-What are concatenation operators?

All relational operators can be used with strings to perform comparison. symbol for string concatenation operation is "+" and it joins two strings.

Q.NO.24-What are assignment operators?

The assignment operator is used to store a value, in a variable. In BASIC symbol "=" represents the operator i.e.

A=10

The value to the right side of the operator is assigned to the variable on the left side of the assignment operator.

Q.No.25-What are two ways to assign to value of an expression to a variable?

There are two ways to assign the value of an expression to a variable

1- By using assignment Operator "="

2- By using "let" statement

Q.No.26-What does it mean by type conversion? Describe rules of type conversion in Basic.

When the program tries to store one type of numeric value to the variable of another type, GW-BASIC performs the type conversion according to the following rules:

1- If a numeric constant of one type is assigned to a numeric variable of a different type, the number is converted according to the type of the variable.

2- During the evaluation of an expression (arithmetic or relational), all of the operands are converted to the degree of precision of the most precise operand.

3- When a floating-point value is converted to an integer, the fractional portion is rounded.

4- A string variable cannot be assigned to a numeric value.

Q.No.27- What is purpose and syntax of LET statements?

Let statement is used to assign the value of an expression to a variable

Syntax:

LET variable = expression

Here the word LET is optional.

Q.No.28-Discuss input statement?

INPUT Statement

This statement is used to input data from the user during the program execution.

Syntax:

INPUT [;] [Prompt string;] list of variables

Prompt string is the message that is displayed on the screen. We can specify more than one variable with a single INPUT statement. During program execution the values entered by the user are assigned to the corresponding variables

Example:-

10 Input "Enter the value of A=",A

According to this program the message will appear on screen.

Enter the value of A=

Now we type a value and it will be assigned to variable A.

Q.No.29-Discuss PRINT Statement?

PRINT Statement

This statement is used to display text and numbers on the screen.

Syntax:

PRINT list of expressions[;]

Expressions in the list may be numeric or string expressions, separated by commas, spaces, or semicolons.

Example:-

```
10      let a=20
20      let b= 40
30      Print a, b
```

The output will be

20 40

Computer will print values of a and b.

Q.No.30-Write down Purpose and syntax of PRINT USING statement?
PRINT USING Statement.

This command is used to display numbers and strings on the screen in specified format.

Syntax:

PRINT USING string expressions; list of expressions [;]

Q.NO.31-Give an example to explain the use of comma (,) and semi colon with PRINT statement?

When we use Comma (,) with print statement then the values will print different zones.

Example:-

10 Print 5,15,25

Out put:-

5 15 25

When we use Semi colon (;) With print statement then value will print with space.

Example:-

10 Print 5;15;25

Out Put:-

5 15 25

Q.No.32-Discuss Read and Data Statement.

Read and Data statements are always used in a same program to as constants to variable Variables are used with read statement and list of constants data statement.

Read Statement:-

Read Statement is used to read values of variables from data statement

Syntax:

Read list of Variables

Data Statement:-

Data Statement is used to store the values of variables given in read statement

Syntax:-

Data list of constants

Example

```
10      Read A,B,C
20      Data 23,25,27
30      Print A,B,C
```

Output

23 25 27

According to this program computer will print values of variables A, B and C which are given in read data statements.

Q.No.33-Write a program to read ten values specified in DATA statement, and display the sum of these values on the screen?

```
10      Cls
20      READ A,B,C,D,E,F,G,H,I,J
30      SUM = A+B+C+D+E+E+F+G+H+I+J
40      DATA 2,4,6,8,10,12,14,16,18,20
50      PRINT "SUM=", SUM
60      END
```

Q.No.34-Write a program to calculate the 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. [Use INPUT statement to get the value for v and t . You have developed the algorithm for the program in the exercise of the previous chapter].

```
10      CLS
20      INPUT "Enter Value of v:", v
30      INPUT "Enter Value of t:", t
40      LET S = v*t
50      PRINT "Value of S="; S
60      END
```

Q.No.35-Write a program to calculate the volume of cylinder. The Program should get the values for height of the cylinder and the radius of its base from the user through INPUT statement.

```
10      CLS
20      Input "Enter the radius=", r
30      Input "Enter the height=", h
40      V=3.14*r*r*h
50      Print "Volume of Cylinder=", V
60      END
```


Q.No.36-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 students [Hint: use INPUT statement to get data from the user. Suppose total marks are 850].

```

10  CLS
20  INPUT "Enter student's Name:", SName$
30  INPUT "Enter Father's Name:", FName$
40  INPUT "Enter Class:", Class$
50  INPUT "Enter Section:", Section$
60  INPUT "Enter Roll No:", RN
70  INPUT "Obtained Marks in English out of 150:", English
80  INPUT "Obtained Marks in Urdu out of 150:", Urdu
90  INPUT "Obtained Marks in computer Sc. Out of 100:", CSc
100 INPUT "Obtained Marks in Physics out of 100:", Phy
110 INPUT "Obtained Marks in chemistry out of 100:", Chm
120 INPUT "Obtained Marks in Math out of 100:", Math
130 INPUT "Obtained Marks in Pak Study out of 75:", Pst
140 INPUT "Obtained Marks in Islamiat out of 75:", Isl
150 Total = English + Urdu + CSc + Phy + Chm + Math + Pst + Isl
160 Percentage = (Total / 850) * 100
170 CLS
180 PRINT "Report Card"
190 PRINT "Student's Name:" SName$
200 PRINT "Father's Name:" FName$
210 PRINT "Class:", Class$
220 PRINT "Section:", Section$
230 PRINT "Roll No.:", RN
240 PRINT "English.....", English
250 PRINT "Urdu .....", Urdu
260 PRINT "Computer Sc.....", CSc
270 PRINT "Physics .....", Phy
280 PRINT "Chemistry.....", Chm
290 PRINT "Math .....", Math
300 PRINT "Pak Study .....", PSt
310 PRINT "Islamiat.....", Isl
320 PRINT "Total .....", Total
330 PRINT "Percentage.....", Percentage
340 END

```

Q.No.37-Write a program to compute the square of a given number. The program should get the number from the user through INPUT statement.

```

10  CLS
20  INPUT X
30  LET Z = X * X
40  PRINT Z
50  END

```


Q.NO.38-Write a program to calculate and print the sum and average of 3 numbers using LET statement.

```
10  CLS
20  INPUT "Enter the value of A=",A
30  INPUT "Enter the value of B=",B
40  INPUT "Enter the value of C=",C
50  LET x=A+B+C
60  LET Average = x/3
70  PRINT "The Sum is ";x
80  PRINT "The average is "; Average
90  .END
```

Q.No.39-When error message of type mismatch error occur?

A numeric variable must be assigned a numeric value and a string variable must be assigned to a string value. If the program tries to assign a string value to a numeric variable or vice versa, "a type mismatch error" will occur.

Q.No.40-When error message of out of data occurs?

If the number of variable in list of variables exceeds the number of elements in the DATA Statement an out of data message occur.

Q.No.41-Discuss restore statement?

This statement causes the DATA statement to be reused (if it has already been used) by the READ Statement.

Syntax:-

RESTORE [line number]

The line number specifies the line number of a DATA statement which has to be read again.

Example:-

```
10  Read A,B,C
20  Restore 50
30  Read X,Y,Z
40  Print A,B,C,X,Y,Z
50  Data 10,20,30
60  END
```

Out put:-

10 20 30 10 20 30

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