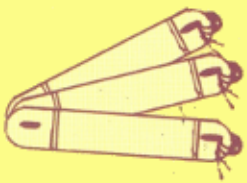
Shri Veda Bharathi



VEDAS and COMPUTERS

(Computer Science in Vedas)

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CHAPTER - I

INTRODUCTION

The Indian tradition regards the Vedas as the source of all knowledge. They are scriptures that are self- revealed to Rishis of great insight who touch upon the ultimate truth in a unique way through the mantras. They are found to contain thoughts on every subject of importance like philosophy, religion, culture and science.

The beautiful edifice of the Vedas reached its pinnacle of glory at the time of Sage Veda Vyasa. The Vedas were broadly classified by him as Rigveda, Yajurveda, Samaveda and Atharvaveda. These Vedas were further expanded into more than a thousand branches which were the source of knowledge for several centuries. It is to his credit that he evolved a systematic methodology for protection of Vedas from generation to generation.

Though the main thrust of the Vedas is on the spiritual front, they contain plenty of information about the temporal world. Within the broad description of Yajna, Moksha etc., many basic concepts of modern Mathematics, Physics, Chemistry, Life sciences, Astronomy, Aeronautics etc., were found embedded in them. In addition,the **Āyurvēda**(आयुर्वेद)dealing with health Science,**Sthāpatya vēda**(स्थापत्य वेद) dealing with civil constructions etc., have detailed descriptions of the worldly subjects.

CHAPTER II

ABOUT COMPUTER SYSTEMS

The Influence of Computers on Modern Society

The subject of 'Science and Technology' has a glorious history of inventions that revolutionised our lives. Some important inventions in the past few centuries are : the Printing Press (1440), the Telegraph (1844),the Automobile(1875), the Telephone(1876), the Radio Signals(1894), the Aeroplane(1903), the Television(1925), and the Colour Television(1950).

But the Computer has overtaken all the other inventions. Every segment of our society is getting influenced, nay, invaded by this wonderful device. The massive entry of computers is seen in steel industry, oil refineries, atomic power establishments, etc., to mention a few. Though there was heavy resistance in the early stages because of the human resources problem, the advent of small sized and low cost personal computers have made them penetrate into all strata of our society.

We also see them in class rooms as they have become handy visual aids for the teachers. In the field of medicine, the computers are playing the crucial role of qualitative and quantitative analysis. People are resorting to less expensive computer- based investigations for Blood Pressure,ECG etc., all over the world. Instruments like the Glucometer use computers for assessing the level of Glucose in the blood. The role of computers in Telecommunications has set a new record,

CHAPTER III

ABOUT VEDAS & Mīmāṃsā

(मीमांसा)

What is Veda?

Traditional scholars maintain that it is a group of statements or sentences of **apaūruṣēya(अपौरुषेय)** 'non-human agency' kind. The sages heard certain divine statements during penance,i.e., the transcendental state of mind. For this reason they are also known as **śruti(श्रुति)** the 'auditory'.

On the other hand,we find a person uttering a sentence, with a view to give form for a particular intention he has in mind. A person uses the words to express some meaning, and behind the meaning there is an intention of that person to exhort somebody else also. Such sentences are called 'worldly sentences **paurūṣēya (पौरुषेय)**

In the case of the Vedic sentences, there is no involvement or intention of any particular person behind the meaning of sentences. For this reason they are called **apaūruṣēya(अपौरुषेय) .**

What is Mīmāṃsā (मीमांसा) ?

The subject that was identified for accurate interpretation of Vedic statements is **mīmāṃsā (मीमांसा)** . This is also called a science of statements, **vākyaśāstra (वाक्यशास्त्र)** or **vākyārthavicārāna śāstra (वाक्यार्थविचारण शास्त्र).** It has a set of rules that guide us to arrive at the true meaning of the Vedic statements.

CHAPTER IV

COMPUTER LANGUAGES & SANSKRIT LANGUAGE: A COMPARISON

The character set of a typical computer language, say 'FORTRAN', facilitates the formation of Variables, Constants and Operators which are required for Programming.

CONSTANTS

The language allows several varieties of constants for utilisation with the programs. Different types of constants allowed in this language are as follows:

A) Integer Constants

The numbers having integral values (i.e., without fractional values) are called Integer constants.

Examples of Integer constants:

25, 98, 137 ... and so on

B) Real Constants

The numbers involving fractional parts with precision upto 8 decimal digits are called Real Constants.

Examples of Real constants:

2.54, 3.1236457, 12.1E+5.. and so on

CHAPTER V

COMPUTER LANGUAGE STATEMENTS & VEDIC STATEMENTS : A COMPARISON

For solving the given problems, Computer programs are developed with the help of computer statements in accordance with the predefined grammar of the selected computer language.

At the time of writing a program, all the statements appear to be reaching the execution phase. However,a close study of these statements indicates that some of the statements are meant for the Compiler, and some statements are for Linkage Editor. Only those statements which could not be filtered in the above two stages will reach the execution phase.

The statements that could reach upto the execution phase are called executable statements.

Other statements which are useful to Communicate to the Compiler and Linkage Editor are called non-executable statements. The details are as follows:

Executable Statements

The following are identified as some of the executable statements (Fig.5.1).

1. Assignment statement
2. Control transfer statements
3. Input/ Output statements

CHAPTER VI

COMPUTER COMMAND WORDS & VEDIC COMMAND WORDS: A COMPARISON

Every Programming language reserves a set of words for predefined purposes. These words are key words which facilitate to identify the list of options and facilities available in the computer language and also to concentrate on the syntax of the statements associated with these key words.

Varieties of Key words

Some examples of key words in FORTRAN language are READ, WRITE, IF, etc., as presented in Table 6.1. These key words are also known as System Defined Names or Reserved Names.

Table 6.1: list of some Keywords in FORTRAN

1.	READ	7.	CALL
2.	WRITE	8.	SUBROUTINE
3.	FORMAT	9.	FUNCTION
4.	DO	10.	PROGRAM
5.	CONTINUE	11.	STOP etc
6.	PAUSE		

These reserved words are generally not to be used as variables.However, in subsequent versions of FORTRAN, permission was granted to utilise these key words also as variables with certain conditions.

CHAPTER VII

PRIORITIES OF OPERATORS IN COMPUTER LANGUAGES & PRIORITIES OF Pramāṇa(प्रमाण) in mīmāṃsā (मीमांसा) : A COMPARISON

A study of computer operators in FORTRAN language on the one side and the means of proof in **mīmāṃsā (मीमांसा)** on the other side brings out similarities in both the systems as described in the following sections.

Priorities (Relative Strengths) of the Operators in Computer Language

When an expression contains more than one operator, then a standard procedure will be required to decide the sequence of calculations, i.e., which operator has to be handled first and which operator has to be handled next.

For example,an expression 2+3*5 is having two operators,'+'(for addition) and '*' (for multiplication). If the addition is taken up first and then multiplication, the answer will be 25.

Step 1:	2+3=5	(Addition)
Step 2.	5x5=25	(Multiplication)
		Result = 25

But if multiplication is taken up first and then addition, the answer will be 17.

Step 1:	3x5=15	(Multiplication)
Step 2:	2+15=17	(Addtion)
		Result = 17

CHAPTER IX
MAIN PROGRAM / SUBPROGRAM & Mahā̄prakaraṇa /Avā̄ntaraprakaraṇa (महाप्रकरण/अवान्तरप्रकरण): A COMPARISON

Before we start writing the program code for a given problem, the understanding of the problem is essential to get a grip over the logic. There should be clarity with regard to the main and minor issues of the given problem. The program design will depend entirely on this approach.

Sometimes it is difficult to demarcate the boundary between the main and the minor issues sharply. Even then it may be possible to broadly do so based upon the devices being used, the techniques being applied, and the processes being involved. Thus the given problem can be divided into different parts with links among all, wherever necessary. This methodology is called Modular Approach. In this Modular Approach, the main module is assisted by several submodules.

Now the code is developed for each module appropriately. The code developed for the main module is called the main program and the code for each submodule is called subprogram. They are also referred to as the main routine and subroutine, respectively.

CHAPTER X

DEFINITION AND REFERENCE OF SUBPROGRAM & Prakṛti Vikṛti vibhāga (प्रकृति विकृति विभाग): A COMPARISON

Along with the main programs, the subprograms are also utilised in computer software and the Vedic passages. The details are presented in the following lines.

Concept of Subprograms in Computer languages

In the FORTRAN language the subprograms are broadly classified into two categories:

1. Subroutine subprogram
2. Function subprogram

The guidelines provided for these two categories with respect to their definitions and references are described with reference to fig.9.1,9.2,10.1, and 10.2.

Definition of Subroutine subprogram (Fig 9.2)

1. The title statement must start with a key word SUBROUTINE(Statement 10)
2. The key word should be followed by the name of the SUBROUTINE and a list of formal (dummy) parameters (Statement 10)

CHAPTER XI

DATA TRANSMISSION METHODOLOGY OF SUBPROGRAMS & Yathāsaṅkhyapāṭha (यथासंख्यपाठ): A COMPARISON

Facilities are provided in most of the programming languages like FORTRAN,C and COBOL for establishing the linkages among various logical and physical parts of the programs. An important aspect of the FORTRAN language is that a subprogram can be invoked (referred) from a main program. The process was more liberalised by permitting the reference of a subprogram from any other subprogram also as long as it is not recursive(i.e., calling itself).

Certain guidelines were formulated to establish appropriate linkages between the calling program units and the called program units. Similarly certain rules were framed for passing the data also among the calling and called program units, as described in the following lines:

1. The data can be passed from the calling program units with the help of actual parameters which can be constants, or variables, or expressions.

These actual parameters should be enclosed within brackets which should follow the name of the subprogram being referred. Example:

(Fig.9.1. Statements 40 & 80)

CALL FINDBIG (ASALARY, BSALARY, CSALARY, BIGAMOUNT)

CHAPTER XII

COMPUTER PROJECT MANAGEMENT & Vidhivibhāga (विधिविभाग): A COMPARISON

The development works of high significance are generally conceived by visionaries. A person or an organisation may conceive the idea for taking up a big project, for the benefit of the people in that region. However just getting the idea is not sufficient. They have to make special efforts for translating the idea into a physical form. All these aspects are covered in four phases of project management system.

In the first phase a comprehensive view of the total project has to be obtained. This includes planning and identification of the works involved, the good and bad effects of both short term and long terms, preparation of project appraisal, getting permissions from various quarters, and getting the financial sanctions and resources. In the second phase a thorough study has to be conducted with regard to the development and execution of the project, that is, getting the perfect overview with respect to the equipment, technology, raw materials, products along with their characteristics like shape, quality, quantity of production etc. A detailed plan has to be drawn for implementing the scheme on a long term basis.

CHAPTER XIII

APPLICATION PROGRAMS/ LIBRARY PROGRAMS & Kriyārupa /Siddharūpa (क्रियारुप सिद्धरुप) : A COMPARISON

Categorisation of Programs

Generally it is true that the application programs developed for a variety of problems are different from each other. However it is observed that the programs developed for some problems like calculating the averages, finding the square roots, plotting the graphs, etc., are commonly required by many with almost the same logic. If the program development is carried out intotal isolation, these programs should be developed independently by every needy programmer. This would have resulted in colossal wastage of time and energy.

Fortunately this is avoided by the manufacturers by giving a facility in the form of 'Library programs'.

Many of the commonly occurring problems as listed above (like calculation of averages and plotting of graphs) are identified by the manufactures and the corresponding software programs are developed by specialists for different computer languages like C, FORTRAN, and COBOL. Further, these programs are made available to the application programmers by giving a provision to access

CHAPTER XIV

JOB STEP CONCEPT IN COMPUTERS & Mukhyakrama (मुख्यक्रम) OF mīmāṃsā (मीमांसा) : A COMPARISON

The concepts of jobs and job steps are implemented in most of the computer systems.

In a computer environment, there can be several users invoking the power of computers with different jobs for solving their problems. Even a single user can also deal with different job steps simultaneously. Then the computer has to take a decision with regard to the sequence of handling the programs based on the priorities assigned to each of the programs under the jobs and job steps . With equal priorities assigned to each of the programs, it has to take up the programs in the physical order in which they are submitted. Along with the main program, the associated subprograms also will be executed one after the other.

When there are several main modules (main programs) in a job step for an application, and when several subprograms are also given along with the main programs, it may be necessary to identify the order in which the subprograms have to be executed.

In such cases, the subprograms of the main programs should be executed in the same order of selection of main programs. This is experienced by all the users when the jobs are handled in 'Batch mode'

End of Preview.

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