

DTL Assignment 3

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1 Using Section and Subsection

1.1 Chapter 1 : Abstract Machines

One of the most general concepts employing abstraction is the ***abstract machine*** .

In this chapter, we will see how this concept is closely related to the programming languages. We will also see how, without requiring us to go into the specific details of any particular implementation, it allows us to describe what an implementation of a programming language is. To do this, we will describe in general terms what is meant by the interpreter and the compiler for a language. Finally, will see how abstract machines can be structured in hierarchies that describe and implement complex software systems.

1.1.1 Concepts of Abstract Machine and of Interpreter

the context of this book, the term “*machine*” refers clearly to a computing machine. As we know, an electronic, digital computer is a physical machine that executes algorithms which are suitably formalised so that the machine can “*understand*” them.

Intuitively, an abstract machine is nothing more than an abstraction of the concept of a physical computer.

1.1.2 The Interpreter

Clearly the interpreter must perform the operations that are specific to the language it is interpreting, L . However, even given the diversity of languages, it is possible to discern types of operation and an “*execution method*” common to all interpreters.

1.1.3 An Example of an Abstract Machine: The Hardware Machine

From what has been said so far, it should be clear that the concept of abstract machine can be used to describe a variety of different systems, ranging from physical machines right up to the World Wide Web.

As a first example of an abstract machine, let us consider the concrete case of a conventional physical machine such as that in Fig. 1.3. It is physically implemented using logic circuits and electronic components. Let us call such a machine MHL H and let L H be its machine language.

1.2 Chapter 2 : How to Describe a Programming Language

A programming language is an artificial formalism in which algorithms can be expressed. For all its artificiality, though, this formalism remains a language. Its study can make good use of the many concepts and tools developed in the last century in linguistics (which studies both natural and artificial languages). Without going into great detail, this chapter poses the problem of what it means to “give” (define or understand) a programming language and which tools can be used in this undertaking

1.2.1 Levels of Description

In a study which has now become a classic in linguistics, Morris [6] studied the various levels at which a description of a language can occur. He identified three major areas: grammar, semantics and pragmatics. Grammar is that part of the description of the language which answers the question: which phrases are correct? Once the alphabet of a language has been defined as a first step (in the case of natural language, for example, the Latin alphabet of 22 or 26 letters, the Cyrillic alphabet, etc.), the lexical component, which uses this alphabet, identifies the sequence of symbols constituting the words (or tokens) of the language defined.

1.2.2 Grammar and Syntax

We have already said that the grammar of a language first establishes the alphabet and lexicon. Then by means of a syntax, it defines those sequences of symbols corresponding to well-formed phrases and sentences (or to “sentences” in short). Clearly, at least from the viewpoint of natural language, the definition of the (finite) alphabet is immediate.

2 Maths Paper

College Of Engineering Pune

(An Autonomous Institute Of Government Of Maharashtra)

End Semester Examination Ordinary Differential Equation And Multivariate Calculus (MA-16001)

Date : December 20, 2022

Duration : 1 hour

Branches : All

Max marks : 60

Programme : S.Y B.Tech

Semester : I

Name: Shrikant Hamand

MIS.NO : 112103048

Division : 1

Batch : S3

Instructions:

1. All questions are compulsory.
2. All symbols have their usual meanings.
3. Figures to right indicate course outcomes and full marks.
4. Mobile phones and programmable calculators are not allowed.
5. Writing anything on question paper , exchange of stationary, calculator is strictly not allowed.
6. Write all subparts of question of question together.

Q1. Solve any three questions

a) Write y_p (particular solution) for the differential equation

$$y'' + 7y' + 12y = \cos(6x).$$

b) A Capacitor = 0.2 farad in series with a resistor $R = 20$ Ohms is charged from a source $E_o = 24$ V. Find the voltages $v(t)$ on the capacitor, assuming that at $t=0$ the capacitor is completely uncharged.

c) Solve the integration

$$\int_a^b x^2 dx$$

d) Solve the differential equation $y'' + y' = 2x^2 + e^2x$, using the method of Undetermined Coefficients.

Q2. Solve the following equations

(1) Which of the following sequences converge and which diverge? Find the limit of each convergent sequence and justify your answers.

(i) $a_n = (-1)^n \left(1 - \frac{1}{n}\right)$ (ii) $a_n = \frac{\ln n}{n^{\frac{1}{n}}}$

(2) For any $\triangle ABC$, prove that -

$$a \sin(B - C) + b \sin(C - A) + c \sin(A - B) = 0$$

(3) Find the value of

$$\sqrt{3} \csc(20^\circ) - \sec(20^\circ)$$

.

(4) Find the value of $f(x) = \frac{\tan(3x) \ln(x+1)}{\sqrt[3]{\sin^6 x}}$ when x tends to 0.

(5) Find $\frac{dy}{dx}$ for $y = e^{6 \log_e(x-1)}$, $x > 1$.

Q3. Solve the following equations

(a) Solve the following differential equation.

$$y'' + by' + cy = 0 \quad (1)$$

(b) Solve the following Homogeneous differential equation.

$$y'' + y' = 2x^2 + e^2x$$

c)

$$\begin{array}{lll} x = y & w = z & a = b + c \\ 2x = -y & 3w = \frac{1}{2}z & a = b \\ -4 + 5x = 2 + y & w + 2 = -1 + w & ab = cb \end{array}$$

(d) Solve the summation:

$$\sum_{n=1}^{\infty} 2^{-n} = 1$$

(e) Obtain the general solution (or particular solution) of the following differential equations.

$$y_0 = 2 \sec 2y$$

Q4. Solve the following questions

a) Solve the following determinants

(i)

$$\begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix} + \begin{vmatrix} 4 & 5 & 9 \\ 6 & 2 & 6 \\ 3 & 8 & 7 \end{vmatrix}$$

(ii)

$$\begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix} * \begin{vmatrix} 4 & 5 & 9 \\ 6 & 2 & 6 \\ 3 & 8 & 7 \end{vmatrix}$$

b) Find $\det(AB)$ if $A = \begin{bmatrix} \sin x & \cos x \\ \cos x & -\sin x \end{bmatrix}$ and $B = \begin{bmatrix} 2 & \tan x \\ \cos x & 0 \end{bmatrix}$.

c) Let k be a number. Then the matrix $A = \begin{bmatrix} k & 0 & \cdots & 0 \\ 0 & k & \cdots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & 0 & k \end{bmatrix}$ is called as ?

3 Inserting Images



Figure 1: Kakashi Hatake

4 Inserting Table

4.1 Adding Table Manually

Table 1: Marks of students in T1

Name	FCS	ODEMC	PPL	DSA
Himanshu	18	13	14	19
Dhananjay	15	16	12	17
Harshal	14	17	15	14
Hariom	17	14	13	15
Aditya	11	19	16	16

4.2 Adding Table from .csv file

Name	Math	Physics	Chemistry
Hariom	90	96	41
Dhananjay	90	64	47
Shrikant	90	97	55
Aditya	99	55	48