INTRODUCTION:
MAPPING THE DOMAIN

Cognitive science aims at the study and explanation of human cognitive capacities like perception, memory, reasoning, language use and so on. It is a distinctively multidisciplinary enterprise emerging out of the interaction of various disciplines like Artificial Intelligence, Cognitive Psychology, Linguistics, Neuroscience and Philosophy, each studying human cognitive capacities in its own way. It is not a mature or well-defined science like, say Physics. Hence it depends and draws heavily on the resources of the contributing disciplines. The present work is not an empirical inquiry into the human cognitive capacities as such, though it certainly has specific implications for such an inquiry. Hence the thesis will not, at any stage of the investigation, be concerned with any of the subdisciplines except Philosophy. The study is restricted to certain philosophical assumptions that makes cognitive science a legitimate discipline.

0.1 THE FOUNDATIONAL ASSUMPTIONS

Cognition is essentially an internal mental process. Hence philosophical discussions on cognitive science revolve around two basic questions: 1. What is the nature of mind? 2. What is the nature of cognitive processes? These questions are interrelated and interdependent in the sense that an answer to any one of them would determine the answer to the other. In what follows I shall identify a set of interrelated issues that form the philosophical foundations of the emerging discipline. The issues pertain to the existence and nature of minds or knowing things, to the mind-body distinction, to the nature of cognition and to the method of cognitive science. In dealing with them I shall describe the
approach of the contemporary cognitive scientists and cognitivist philosophers — I shall call them cognitivists — to these basic questions and my reactions to their approach. In responding to these questions, I do not intend to question the possibility or viability of cognitive science. My objective, on the other hand, is to specify what should be our approach to the basic issues that would make a scientific study of mind and cognition possible. The foundational assumptions of cognitive science fall into two broad categories: substantive assumptions and methodological assumptions. And we shall deal with each of them briefly.

0.1.1 Substantive assumptions

The substantive assumptions are basically concerned with the nature of the mind and the cognitive states and processes. They have primacy over methodological assumptions since they determine the latter. We shall identify three such substantive issues for our discussion. They are the following:

0.1.1.1 Existence and nature of mind

Any scientific inquiry must have a specific domain of its own. It must be about some particular aspects of the universe and not the universe as a whole. Hence, to specify its domain, it is necessary to make certain inclusions and exclusions. In cognitive science we study the cognitive aspects of the universe. Therefore, all those entities which exhibit cognitive properties fall under its scope. There are basically two assumptions regarding the existence and nature of knowing things or minds:

1. There is a natural domain corresponding to cognition, namely minds or knowing things.
2. The cognitive states and processes of the mind are phenomenal in nature. That is, cognitive states and processes like perception, memory, reasoning etc., are conscious mental states and processes with their phenomenological properties.

These two assumptions pre-theoretically specify the domain and goal of inquiry in cognitive science.
According to cognitive science as it is practised today, in addition to humans, animals, computational machines and even hypothetical creatures like martians possess cognitive capacities and, therefore, constitute the domain of cognitive science. As against this position, I defend the view that the proper domain of cognitive science consists only of human cognitive capacities. The martians, machines and the non-human animals come into the picture only to the extent that they can contribute to our understanding of human cognitive capacities. The function of the talk of martian cognitive capacities for example, is to clarify the obscure psychological concepts that impede the scientific study of the human cognitive functions. Apart from this, the cognitivists' speculations about martian psychology do not make much sense. Again, machines do not at all possess any cognitive capacities; they just provide models for the study of the human mind. It is true that some animals are endowed with certain cognitive capacities though these are less sophisticated than those of humans. We study the animal cognitive capacities only in so far as they throw light upon our own cognitive capacities. Hence I conclude that the project of the cognitivists to develop a universal psychology and cognitive science covering humans, non-human animals, machines and martians is untenable.

0.1.1.2 Mind-body distinction.

As stated already, one of the pre-theoretical assumptions of cognitive science is that the cognitive states and processes are phenomenal in nature. The phenomenal features or the conscious aspects do not yield to any description in physical vocabulary. This, has led to the notorious mind-body dualism: the doctrine that mind and body are totally different sorts of substances, yet causally interact with each other. Cognitive science is not concerned with mind-body dualism. However, the philosophical response to this problem has specific implications for cognitive science. Once substantial dualism is granted, cognitive science is sheer impossibility, for we are not in a position to make a scientific study of the mysterious, unextended, immaterial substance we call mind. Moreover, in accounting for the causal interaction between the mind and the body we face insurmountable difficulties. It is not possible for us to
understand how the cognitive states and functions described phenomenologically could be physically realised. As a result, cognitive science cannot rest upon substantial dualism.

There are three reactions to the mind-body problem within the framework of materialistic monism, the doctrine that there is only one kind of substance viz., matter with its physical properties. The first reaction is rightly characterised as reductionism. On this approach, the mental properties, cognitive or otherwise, are reducible to certain physical properties. Consequently, the mind does not have any ontological status and there is nothing for cognitive science to enquire into. This contradicts the basic assumption that there exists a natural domain corresponding to cognition that makes cognitive science possible. Moreover, the denial of cognitive mental states and processes goes counter to our own experience and to the strong pre-theoretic intuition regarding the nature of our mental states. Since reductionism is rooted in materialistic monism, it makes a scientific study possible. But unfortunately, there is no mind for us to make a scientific study of.

The lesson we learn from reductionism is that if there is to be a science of the mind, our pre-theoretic intuition regarding the nature of the mind has somehow to be preserved without our falling back upon substantial dualism. The mental properties must have a place within the framework of materialistic monism. That is, the irreducibility of mental properties and materialistic monism must somehow be combined. This is achieved by maintaining that there is, in fact, a distinction between the mind and the body. However, the distinction is not substantial but only conceptual or logical. The conceptual distinction between the mind and the body forms the foundation of contemporary cognitive science. However, the conceptual distinction has misleading consequences for cognitive science: the cognitivists are led to think that the mind is distinct from the body not just logically or conceptually but empirically as well. Hence the mind could be understood and scientifically studied independent of the underlying physical facts, neurological or otherwise. From this cognitivists conclude that mental properties could be multiply realised. That is, the mind could be realised not only by the human or animal brain with its neurological structures and processes but also by mechanical or
electrical computers, and other such machines and organisms. This constitutes the second approach to the mind-body problem from the point of view of materialistic monism. Why the thesis of multiple realisability is not tenable is dwelt upon in detail in the chapters that follow.

The third approach to the mind-body problem, which is adopted and defended in this thesis maintains that the mind is conceptually distinct from the body/brain but is not empirically independent of the brain. Though the mind can be conceived and understood independent of the body, a scientific study of it is not possible without an inquiry into the physiological facts that realise the mind. That is, for a scientific study of the mind, the kind of physical stuff that constitutes or causes the mental properties must be taken into account. It is an empirical fact that mental properties are exhibited by creatures with specific types of neural structures and processes. If the nature of mental states and processes is determined by the neural structures and processes, then the mental properties can be attributed only to creatures with a central nervous system like that of humans. To non-human animals are attributed mental properties, provided the structure and organisation of their brain and nervous system as well as the behaviour they produce are similar to ours in the relevant respects. This justifies why only human cognitive capacities constitute the subject matter of cognitive science.

0.1.1.3 Nature of cognition: the computational-representational assumption

Our pre-theoretic intuition suggests that the cognitive states and processes are the conscious states and processes of the mind. But this intuition by itself does not throw much light upon the nature of the internal states and processes. In addition, there are, however, other equally strong pre-theoretic intuitions which do not contradict it. They are three in number: 1. The cognitive states and processes are productive or creative; 2. they are intentional; 3. they are causally efficacious in the production of behaviour. Intuitions such as these suggested to the cognitivists that the cognitive processes could be defined as some kind of computation. And by computation they mean rule-governed manipulation of internal symbolic representations. This view implies that cognitive states are computational as well as representational states, and that the mind is
a computational/representational device or a computer. The creativity, intentionality and the causal efficiency of the cognitive states and processes are explained in terms of computational processes. Since computation is the manipulation of formal symbols and the rules governing the process apply to the symbols on account of their formal properties, this is a formalist approach to the study of mind.

In this thesis I describe two objections to this approach. First, the approach is reductionist in the sense that it fails to do justice to the "phenomenal", "qualitative" or "subjective" features of our cognitive mental states and processes. They are "felt" in certain ways by us on account of their being accessible to us in awareness. This facet of human mentality remains unaccounted for within the computational representational model. Second, in defining cognition as rule-governed manipulation of formal symbols, only the formal or the syntactic features of our mental states and processes are taken into account. The semantic features do not find a proper place within the scheme. By the semantic features of the mental states, we mean their intentionality, their being directed to certain objects and states of affairs. My disagreement with the cognitivists is not on the assertion that cognition is a sort of computation; it might very well be. But it is not the sort of computation they speak of: the rule governed manipulation of symbolic representations. Computation is essentially a semantic process. Hence, strictly speaking, machines cannot compute. Their rule-governed manipulations of symbols are computations only for humans or for other intelligent beings who interpret them.

0.1.2 Methodological assumptions

Cognitive science is committed to two important methodological assumptions. The first is that the scientific study of cognition is individualistic in its approach. We shall call it this assumption methodological individualism or internalism. The second assumption is that the cognitive faculty can be analysed into a number of capacities, and the cognitive capacities of the mind are explained by appealing in part to the analysing capacities and their organisation. We shall call this strategy functional analysis.
0.1.2.1 Methodological Individualism

Cognition we know is an internal mental process. Cognitive science is concerned with the internal mental states and processes only. So by the methodological individualism of cognitive science, we mean that it does not take into account the influence of environment and culture on cognitive processes. The approach, however, does not deny such influences. But such influences are mediated through individual perceptions and internal representations of the cognizer and hence cognitive science has to do only with the latter.

0.1.2.2 Functional analysis

The second methodological assumption is that the mind or the cognitive faculty can be divided into a number of cognitive capacities, each of which can be studied, to a great extent, in isolation from the others. Such partitioning of the cognitive faculty is a requirement for a scientific understanding of cognition. However, it is important to note that the various cognitive capacities such as perception, problem solving, memory, language use etc., make a system and hence it is the same mind which exercises each of these capacities. In other words the cognitive capacity of the mind as a whole is explained by appealing to the capacities of component systems.

Discussions on the methodological issues as such will not figure at any stage of this inquiry except for a brief mention of functional analysis in the third chapter. There are two reasons for this omission. First of all, our primary interest lies in those substantive theses regarding the nature of mind and cognition that make cognitive science possible. The methodological issues concern us only to the extent that they arise out of the substantive assumptions. Even when we are dealing with functionalism we do not discuss whether functional analysis is an adequate research strategy in cognitive science. We are interested in finding out whether the mental states and processes can be defined as functional/computational states and processes. Secondly, cognitive science being an immature science, its methodological assumptions are pretty general in character and the position of the thesis with regard to the substantive issues does not contradict the methodological assumptions. Hence there is no reason why the latter should receive much attention in the present work.
0.2. THE LAYOUT OF THE INQUIRY

In the discussions that follow, I have not identified and classified the substantive issues on above lines. However, the thematic thrust of the various chapters directly deals with these issues though none of the chapters exclusively deals with them in that order. The inquiry takes its own course touching one or the other of the foundational questions in various stages of the inquiry. Hence I shall briefly describe how the inquiry proceeds.

Almost all the substantive issues identified above are touched upon in the first chapter on Cartesian dualism and cognition. The chapter has a central place in the overall framework of the thesis. The basic issues relating to mind and cognition as they figure in Descartes' writing is important because our understanding of and response to them determine the perspective of the thesis and give direction to the inquiry. Therefore, our interest in Descartes is not merely historical. Our emphasis is on interpreting Descartes in the light of the foundational questions in cognitive science. The central issues in Descartes' philosophy of mind, such as the existence of knowing things, the nature of the mind, the distinction between the mind and the body and his theory of cognition will receive our attention in the chapter.

The second chapter, on reductionism, examines various reactions within the framework of materialistic monism against Cartesian dualism understood as two substance theory. First, we deal with the two versions of behaviourism: the logical and the methodological. Both the versions are infected with the same difficulty. They explain away the mental properties: they deny the internal mental processes we are aware of, and fail to supply a causal explanation of the human cognitive processes and behaviour. Then we proceed to discuss two versions of physicalism: type physicalism and token physicalism. Type physicalism identifies mental properties with neural properties. It is attacked by Kripke and Nagel on the grounds that it fails to accommodate qualitative aspects essential at least to some mental states. It is shown in the thesis that this objection does not hold against type physicalism as it is proposed only as a scientific hypothesis and not as a definition of mental states. The token
physicalists, on the other hand, argue that mental events are the same as physical events, granting at the same time that the mental types could be multiply realised. The multiple readability of the mental as entailed by token physicalism is taken as a boon by most of the contemporary philosophers of mind and cognitive scientists. But in my opinion, it proves a bane to the scientific study of the mind. In addition to the problems associated with multiple readability, token physicalism is troubled by another difficulty. It defines cognitive mental states and processes just in terms of their formal aspects. It is a narrow definition of mental states and processes which excludes the content of the mental states essential to them. It is argued that a science of the mind is possible only if type physicalism is preferred to token physicalism.

The most powerful approach to the study of mind within the framework of materialistic monism is functionalism. Cognitive science as it is practised today is founded upon this philosophical doctrine on the nature of the mind. Hence the third chapter of this thesis is a study of functionalism. Functionalists define mental states in terms of their causal roles, that is their causal relations to sensory stimuli (inputs), behavioural responses (outputs) and other mental states. The theory contains within itself certain aspects of both behaviourism and physicalism. There are two versions of functionalism. Functional Specification Theory (FST) and Functional State Identity Theory (FSIT). The former is committed to type physicalism and the latter to token physicalism. FST can be seen as a reaction to logical behaviourism, as is fairly clear from the writings of the exponents of FST. Though this is not very obvious, it seems to me that a case can be made to show that FSIT is mainly a reaction to methodological behaviourism. I do not undertake to establish this claim in the thesis. To make my point, I only suggest that this has been acknowledged by thinkers like Dennet. One of Dennet's complaints against the functional state identity theorist Fodor is that Fodor fails to note that his own theory is a reaction to Skinnerian behaviourism rather than to logical behaviourism of the Rylean variety.¹

Of the two versions of functionalism, cognitive science as practised today is committed to FSIT. This point is clarified in the third chapter of this thesis by showing that the theory conceives cognition to be a rule-governed symbol manipulation. Following Searle's celebrated Chinese room argument, it is argued that this model of cognition is an implausible one. The second half of the chapter works out a critique of functionalism in general based on two Cartesian intuitions: first, the mind-body relation is a contingent one and second, phenomenal characteristics are essential to and definitive of mental states.

Block and Fodor raised two qualia centred objections against functionalism: the inverted qualia argument and the absent qualia argument. Sydney Shoemaker developed a very sophisticated version of FST which he claims does not fall prey to these objections. The fourth chapter of my thesis starts with a discussion of Shoemaker's strategies for meeting the objections. In what follows, it is argued that in the process of meeting the objections, Shoemaker has provided a model of cognition within FST. This is elucidated with reference to a reconstruction of Shoemaker's causalist model of perception. The chapter concludes with a critical review of Shoemaker's thesis. My main objection to Shoemaker is that despite his claims to the contrary, his theory fails to accommodate the subjective and conscious aspects of our mental life. An exercise in Shoemaker's version of functionalism becomes essential because of the fact that this is perhaps the only competing model of mind once we reject FSIT. Hence it becomes imperative that we examine whether this model can accommodate our pre-theoretic intuitions regarding the nature of mind and cognitive states. Our finding is that it too fails like its counterpart.

The fifth chapter on consciousness is a search for a theory of mind which can account for the phenomenological aspects of our cognitive mental states. There are three facets of human mentality: awareness, phenomenality and intentionality. The chapter defends the thesis that there is a conceptual relation among these features of mentality. First, we critically examine the theoretical reasons and empirical evidences cited
by Nelkin for maintaining that these three aspects are distinct and separable. Then it is argued that each of our conscious mental states is a unitary state with all the three features of consciousness. The unity of consciousness defended in the chapter does not conflict with the view that mind can be divided into various faculties like those for problem solving, perceptual analysis, language use etc. Exploiting Dennet’s distinction between personal and subpersonal levels of description, it is argued that our talk of the unity of consciousness is a talk at the personal level whereas our talk of the division of cognitive faculty into a number of information processing systems belongs to the subpersonal level of description. Finally we aim at working out a plausible personal level theory of consciousness. On this theory, awareness, intentionality, and phenomenality are inseparable features. There are no independent intentional states or qualitative states. Nor is there any second order consciousness as many cognitivists maintain. An adequate personal level theory of consciousness is important because in the absence of such a theory, it is not possible to develop a subpersonal theory of mind that can give a proper explanation of cognitive mental states and processes.

The cognitive mental states and processes are conscious states and processes. The problem with contemporary cognitivism is that it does not properly explain consciousness. A scientific explanation of consciousness is possible only by appealing to the structures and processes that realise the mental properties. The cognitive mental states and processes, we know, are realised as a matter of fact by the structure and organisation of the brain and nervous system. This leads us to the idea that the mind is species-specific in its nature and functions. So the attempt of the cognitivists to construct a species independent psychology is implausible. And the question whether martians have mind or whether computers can be attributed psychological properties does not simply arise at all. Hence the thesis winds up with a defence of the species-specificity of psychology and cognitive science.

Finally, one may raise the question why at all we must inquire about mind and cognition. Though the answer to this question does not come under the purview of the present inquiry, I shall just say a few words by way of its justification. There are two basic kinds of inquiry man is engaged in.
The first is an investigation of the physical world he is situated in, resulting in the development of natural sciences. This inquiry is an essential part of his struggle for existence and survival. The other is an inquiry into his own nature. The latter inquiry is in fact, prompted by the former. It is only natural that he tries to understand his own nature once he comes to know the various aspects of the physical universe. As the horizon of his knowledge of the physical universe widens, it becomes necessary for him to redefine his own nature and the way he is related to the rest of the universe. It is a natural corollary of the thesis defended here that the study of mind and cognition is a part of our basic inquiry into our own nature.