Cognitive science – the artificial intelligence approach

Artificial intelligence (AI)A potential for emulating the human brainEmbodimentShift the focus of research to the realization of an intelligent agentIntelligent agent (IA)Aims to understand and build intelligent machinesActuatorsEntities that act/ interact with an environment (i. e. hands, legs, mouth)Universal computing machineDeveloped by Alan Turing, a concept that provides that basis on which all modern digital systems are designed: in its contemporary form, commonly referred to as a " finite-state" design or " sequential-system" design; could be employed to design and build an AI machineFinite state modelReadily implemented within a machine with dedicated integrated circuit switches that can control the entire systemArchitecturesDigital computer organizationsCentral processing unit (CPU)Calculations, logical decisions, program sequence control; determines state transitions; makes cognitive decisions (cognitive manipulation)MemoryStores programs, results, temporary results, data; stores state definitions, external information, transition rules; facts, cognitive rules, cognitive methodsInput/ outputSensor information, control of all external system elements; receives sensory information, provides control to external world changes; signals from external sensors and to external actuators, conversion to internal representation, conversion to action signalsCommunication (bus)Communication between other elements of the computer; communication with external worldTuring testUltimate test of an IA, if a machine were able to pass the test in its most refined form, it would enable one to make the argument that the " intellectual" responses of that machine were indistinguishable from those of human beingProgramMust surmount a significant number of hurdlesHierarchical networkInformation communication in this is bidirectional; upward flow produces coherent

perception, but learned information in memory also flows downwardThroughputCompleting a task, such as recognizing an objectBytesVast memory capacityMoore's lawA functional relationship between the number of components in integrated circuits and industrial product cyclesTerabyteCorresponds to 2^40 bitsBitsUnits of binary informationArtificial general intelligence(AGI)An intelligence that is beyond the human levelEvolutionary computing (EC)A collection of computational methods that have been modeled on the principles of biological evolutionSimple reflex agentsSelect actions on the basis of existing precepts - a " survival" mechanism (i. e. IF car ahead is braking, THEN initiate braking)Model-based reflex agentsMust keep track of precepts that they cannot follow continuously; thus, they maintain some internal state (i. e. agent negotiating a maze needs to keep track of map)Goal-based agentsActions depend on the goal to be achieved, in which the agent retains some goal information that describes desirable situations (i. e. when riding in a taxi, the goal might be a passenger's destination; agent must have some planning and searching algorithms to achieve this)Utility-based agentsEnhanced goal-based agents, goals are not sufficient to achieve " high-quality" behavior, to these goals, we need to add a " quality factor" Learning agentsAn outgrowth of an idea from Turing, to build a learning machine and then teach itMultiagent systemA system may often include collections of different agents interacting with one anotherGame theoryThe rational side of social science - where social is interpreted broadly to include human as well as nonhuman players, such as computers, animals, and plants (i. e. the prisoner's dilemma)CodingThe programmer must find a suitable representation of the informationCategorizationFacts, rules; the programmer

must specify a sufficient set of rules to define all the categories that the program must supportProcedureAlgorithmic processes, the programmer must specify in advance the actions to be taken by the system for all combinations of inputs that may occurForagingNumerous examples come from biological systems where researchers seek to develop models for this behavior, bird migration, visual navigation, and predator-avoidance behavior in fish ONCOGNITIVE SCIENCE – THE ARTIFICIAL INTELLIGENCE APPROACH SPECIFICALLY FOR YOUFOR ONLY$13. 90/PAGEOrder Now