

# Contents

---

<i>Series Editor's Preface</i>	xi
<i>List of Illustrations</i>	xiii
<i>Acknowledgements</i>	xv
<b>Introduction</b>	<b>1</b>
<b>1 Historical and Theoretical Background</b>	<b>5</b>
1.1 Early modern roots	6
1.1.1 Descartes: the ghost in the machine	6
1.1.2 Hobbes and Hume: mental mechanics	8
1.1.3 Pascal and Leibniz: mathematical machines	11
1.2 Turing and the 'Dartmouth Conference'	15
1.3 Varieties of AI	17
1.4 Is AI an empirical or <i>a priori</i> enterprise?	22
1.5 AI and the mind-body problem	27
<b>2 Classical Cognitive Science and 'Good Old Fashioned AI'</b>	<b>30</b>
2.1 Three roots of the classical approach	31
2.1.1 Logic	32
2.1.2 Linguistics	35
2.1.3 Functionalism and the 'Representational Theory of Mind (RTM)'	37
2.2 Algorithms, Turing Machines and Turing's thesis	41
2.3 GOFAI's success stories	51
2.3.1 Reasoning: the logic theory machine	51
2.3.2 Chess: Deep Blue	55
2.3.3 Conversation: ELIZA	60
2.4 GOFAI and the mind-body problem	63
<b>3 Gödel, the Turing Test and the Chinese Room</b>	<b>65</b>
3.1 Gödel's incompleteness theorem	66

3.2	The Turing Test	73
3.3	Searle's Chinese Room	79
<b>4</b>	<b>Connectionism</b>	<b>88</b>
4.1	Physiological and psychological realism	90
4.2	Representation reconsidered	95
4.3	Some connectionist models	101
4.3.1	Pattern recognition: the mine/rock detector	101
4.3.2	Language: past-tense learning	103
4.3.3	Disorders: network models of schizophrenia	106
4.4	Connectionism and the mind-body problem	109
<b>5</b>	<b>Criticisms and Consequences of the Connectionist Approach</b>	<b>113</b>
5.1	Connectionism, folk psychology and eliminativism	113
5.2	Connectionism and compositionality	122
<b>6</b>	<b>The Dynamical Approach</b>	<b>131</b>
6.1	Motivation	131
6.2	Dynamical systems theory	133
6.3	Dynamical cognitive science: time and timing	136
6.4	Dynamical cognitive science in action	141
6.4.1	Finger wagging: the 'HKB' model	142
6.4.2	Beer on bugs	144
6.4.3	Perceptual categorisation	148
6.5	Taking stock: consequences and criticisms of the dynamical approach	150
6.5.1	Explanation	150
6.5.2	Situation	153
6.5.3	Representation revis(it)ed	157
6.5.4	Incrementalism	163
6.6	The dynamical approach and the mind-body problem	167
<b>7</b>	<b>The Future: Mind and Machine Merged</b>	<b>172</b>
7.1	The extended mind hypothesis	174
7.2	Cognitive technology and human-machine hybrids	182
7.3	'The singularity'	188

<b>Conclusion</b>	<b>194</b>
<i>Notes</i>	197
<i>Suggestions for Further Reading</i>	200
<i>Works Cited</i>	203
<i>Index</i>	215