TODAY'S QUOTE

"The computers do what you tell them to do, not what you want them to do. "

(Alexander Atanasov)

CHAPTER 4 – DECISIONS

4.1 – PART 1 – ASCII

3

SFU

ASCII VALUES

- Standard characters available
- <u>http://www.asciitable.com/</u>

SFU

ASCII VALUES

<u>Dec</u>	H)	(Oct	Char		Dec	Hx	Oct	Html	Chr	Dec	Hx	Oct	Html	Chr	Dec	Hx	Oct	Html C	hr
0	0	000	NUL	(null)	32	20	040	∉ #32;	Space	64	40	100	«#64;	0	96	60	140	& #96;	100
1	1	001	SOH	(start of heading)	33	21	041	∉#33;	1	65	41	101	A	A	97	61	141	& # 97;	a
2	2	002	STX	(start of text)	34	22	042	 ∉#34;	"	66	42	102	B	в	98	62	142	b	b
3	3	003	ETX	(end of text)	35	23	043	∝# 35;	#	67	43	103	C	С	99	63	143	«#99;	С
4	4	004	EOT	(end of transmission)	36	24	044	∝# 36;	ę.	68	44	104	∝#68;	D	100	64	144	≪#100;	d
5	5	005	ENQ	(enquiry)	37	25	045	∉#37;	*	69	45	105	≪#69;	Е	101	65	145	e	e
6	6	006	ACK	(acknowledge)	38	26	046	 ∉38;	6	70	46	106	≪ #70;	F	102	66	146	«#102;	f
- 7	7	007	BEL	(bell)	39	27	047	 ∉39;	1	71	47	107	G	G	103	67	147	«#103;	g
8	8	010	BS	(backspace)	40	28	050	∝#40;	(72	48	110	H	н	104	68	150	«#104;	h
9	9	011	TAB	(horizontal tab)	41	29	051))	73	49	111	¢#73;	I	105	69	151	i	i
10	A	012	LF	(NL line feed, new line)	42	2A	052	*	*	74	4A	112	¢#74;	J	106	6A	152	j	j
11	В	013	VT	(vertical tab)	43	2B	053	+	+	75	4B	113	¢#75;	K	107	6B	153	≪#107;	k
12	С	014	FF	(NP form feed, new page)	44	2C	054	c#44;	1	76	4C	114	L	L	108	6C	154	≪#108;	1
13	D	015	CR	(carriage return)	45	2D	055	∝#45 ;	- N	77	4D	115	M	М	109	6D	155	«#109;	m
14	Ε	016	S0	(shift out)	46	2E	056	.	- C - C - C	78	4E	116	 ∉78;	N	110	6E	156	n	n
15	F	017	SI	(shift in)	47	2F	057	/		79	4F	117	 ∉79;	0	111	6F	157	o	0
16	10	020	DLE	(data link escape)	48	30	060	∝#48 ;	0	80	50	120	∝#80;	Р	112	70	160	p	р
17	11	021	DC1	(device control 1)	49	31	061	¢#49;	1	81	51	121	 <i>∝</i> #81;	Q	113	71	161	∝#113;	P .
18	12	022	DC2	(device control 2)	50	32	062	∝#50;	2	82	52	122	 ∉82;	R	114	72	162	«#114;	r
19	13	023	DC3	(device control 3)	51	33	063	3	3	83	53	123	 ∉#83;	S	115	73	163	s	3
20	14	024	DC4	(device control 4)	52	34	064	& # 52;	4	84	54	124	&# 84;	Т	116	74	164	t	t
21	15	025	NAK	(negative acknowledge)	53	35	065	∝# 53;	5	85	55	125	 <i>∝</i> #85;	U	117	75	165	u	u
22	16	026	SYN	(synchronous idle)	54	36	066	∝#54;	6	86	56	126	 4#86;	V	118	76	166	∝#118;	v
23	17	027	ETB	(end of trans. block)	55	37	067	∝#55;	7	87	57	127	 ∉87;	W	119	77	167	∝#119;	ω
24	18	030	CAN	(cancel)	56	38	070	∝#56;	8	88	58	130	X	х	120	78	170	≪#120;	х
25	19	031	EM	(end of medium)	57	39	071	∝#57;	9	89	59	131	Y	Y	121	79	171	∝#121;	Y
26	1A	032	SUB	(substitute)	58	ЗA	072	∝# 58;	:	90	5A	132	«#90;	Z	122	7A	172	∝#122;	. Z
27	1B	033	ESC	(escape)	59	ЗB	073		\$	91	5B	133	[[123	7B	173	∝#123;	. {
28	1C	034	FS	(file separator)	60	ЗC	074	∝#60;	<	92	5C	134	\	1	124	7C	174	∝#124;	
29	1D	035	GS	(group separator)	61	ЗD	075	l;	=	93	5D	135	∝# 93;]	125	7D	175	≪#125;	}
30	1E	036	RS	(record separator)	62	ЗE	076	 <i>‱#</i> 62;	>	94	5E	136	¢#94;	<u>^</u>	126	7E	176	≪#126;	~
31	1F	037	US	(unit separator)	63	ЗF	077	∝#63;	2	95	5F	137	∝#95;	_	127	7F	177		DEL

Source: www.LookupTables.com

EXTENDED ASCII VALUES

128 Ç 144 E 160 á 176 192 L 208 L 224 α 129 \ddot{u} 145 ee 161 í 177 193 L 209 \mp 225 β 130 ϵ 146 FE 162 ϕ 178 194 τ 210 π 226 Γ 131 \hat{a} 147 \hat{o} 163 \dot{u} 179 195 $+$ 211 L 227 π 132 \hat{a} 148 \hat{o} 164 \hat{n} 180 $+$ 196 $-$ 212 E 228 Σ 133 \hat{a} 149 \hat{o} 165 \hat{N} 181 $=$ 197 $+$ 213 F 229 σ 133 \hat{a} 150 \hat{u} 166 182 $+$ 198 E 214 π 230 μ 135 ς 151 \dot{u} 167															
129 \ddot{u} 145 e 161 i 177 193 \downarrow 209 \mp 225 β 130 \acute{e} 146 AE 162 \acute{o} 178 \blacksquare 194 \intercal 210 \intercal 226 Γ 131 \mathring{a} 147 \acute{o} 163 \acute{u} 179 $\begin{vmatrix}$ 195 \models 211 \blacksquare 227 π 132 \mathring{a} 148 \acute{o} 164 \mathring{n} 180 \dashv 196 $-$ 212 \sqsubseteq 228 Σ 133 \mathring{a} 149 \grave{o} 165 \mathring{N} 181 \dashv 197 \dotplus 213 e 229 σ 133 \mathring{a} 150 \mathring{u} 166 $\mathring{182}$ \varPi 198 \nvDash 214 \varPi 230 μ 135 ς 151 \mathring{u} 167 $\mathring{183}$ \varPi 199 \downarrow 215 \ddagger 231 τ 136 <	128	Ç 14	4 É	160	á	176		192	L	208	ш	224	α	240	=
130 ϵ 146 F 162 δ 178 194 T 210 T 226 Γ 131 \hat{a} 147 δ 163 \hat{u} 179 195 i 211 i 227 π 132 \hat{a} 148 δ 164 \hat{n} 180 i 196 $-$ 212 i 228 Σ 133 \hat{a} 149 \hat{o} 165 \hat{N} 181 i 197 i 213 r 229 σ 134 \hat{a} 150 \hat{u} 166 $i82$ i 198 i 214 r 230 μ 135 ς 151 \hat{u} 167 $i83$ π 199 i 215 i 231 τ 136 \hat{i} 152 \ddot{y} 168 i 8 201 r 216 $=$ 232 Φ 137 \hat{e} 153 \hat{O}	129	<mark>ü</mark> 14	5 😹	161	í	177		193	Т	209	╤	225	В	241	±
131 â 147 ô 163 ú 179 195 \models 211 \blacksquare 227 π 132 â 148 ô 164 ñ 180 \dashv 196 $-$ 212 $Е$ 228 Σ 133 à 149 ô 165 Ñ 181 \dashv 197 $+$ 213 r 229 σ 134 â 150 û 166 $=$ 182 \parallel 197 $+$ 213 r 229 σ 134 â 150 û 166 $=$ 182 \parallel 198 \models 214 r 230 μ 135 ç 151 ù 167 \circ 183 π 199 \models 215 \ddagger 231 τ 136 $ê$ 152 $Ÿ$ 168 i 84 $=$ 200 \blacksquare 216 $=$ 232 $Φ$ 137 $ë$ 153 O	130	é 14	6 <u>æ</u>	162	ó	178		194	т	210	π	226	Г	242	≥
132 \ddot{a} 148 \ddot{o} 164 \ddot{n} 180 \dashv 196 $-$ 212 \sqsubseteq 228 Σ 133 \ddot{a} 149 \ddot{o} 165 \ddot{N} 181 \dashv 197 \dotplus 213 \overrightarrow{r} 229 $\overrightarrow{\sigma}$ 134 \ddot{a} 150 \ddot{u} 166 \cdot 182 \dashv 198 $\not{\models}$ 214 \overrightarrow{r} 230 μ 135 ς 151 \ddot{u} 167 \cdot 183 \overrightarrow{n} 199 $\not{\downarrow}$ 215 $\not{\downarrow}$ 231 τ 136 \ddot{e} 152 \dddot{y} 168 \dot{i} 184 $\overrightarrow{1}$ 200 \rlap{le} 216 $\not{=}$ 232 \varPhi 137 \ddot{e} 153 \ddot{O} 169 \overrightarrow{n} 185 $\not{=}$ 201 \overrightarrow{r} 217 J 233 \bigcirc 138 \dot{e} 154 \ddot{U} 170 \neg 186 I 203 \overrightarrow{r} 219 235<	131	<mark>â</mark> 14	17 <mark>6</mark>	163	ú	179	1	195	F	211	LL.	227	π	243	\leq
133 à 149 ò 165 Ñ 181 4 197 + 213 F 229 σ 134 à 150 û 166 * 182 1 198 F 214 r 230 μ 135 ç 151 ù 167 * 183 n 199 + 215 + 231 τ 136 ê 152 ÿ 168 ¿ 184 n 200 L 216 + 232 Φ 137 é 153 Ö 169 r 185 201 r 217 J 233 @ 138 è 154 Ŭ 170 n 186 202 L 218 r 234 Q 139 i 155 • 171 42 187 n 203 \overline{r} 219 235 δ 140 i 156 £ 172 4 188 J 204	132	<mark>ä</mark> 14	8 <mark>ö</mark> 8	164	ñ	180	-i	196	- 1	212	E.	228	Σ	244	ſ
134 a 150 \hat{u} 166 182 198 \models 214 r 230 μ 135 q 151 \hat{u} 167 \circ 183 n 199 \models 215 \ddagger 231 τ 136 \hat{e} 152 \ddot{y} 168 i 184 n 200 \sqsubseteq 216 \neq 232 Φ 137 \hat{e} 153 \ddot{O} 169 r 185 \downarrow 201 r 217 J 233 \odot 138 \hat{e} 154 \ddot{U} 170 \neg 186 202 $=$ 218 r 234 Ω 139 i 155 \circ 171 $\frac{1}{2}$ 187 \overline{n} 203 \overline{r} 219 235 δ 140 i 156 \pounds 172 $\frac{1}{4}$ 188 $=$ 204 \models 220 236 ∞ 141 i 157 $¥$	133	<mark>à</mark> 14	9 <mark>ò</mark> 9	165	Ñ	181	4	197	+	213	E.	229	σ	245	1
135 ç 151 ù 167 ° 183 n 199 l 215 l 231 τ 136 ê 152 ÿ 168 ¿ 184 n 200 L 216 = 232 Φ 137 ê 153 Ö 169 r 185 I 201 r 217 J 233 @ 138 è 154 Ü 170 n 186 202 L 218 r 234 Ω 139 i 155 ¢ 171 ½ 187 n 203 r 219 235 δ 140 i 156 £ 172 ¼ 188 J 204 L 220 236 ∞ 141 i 157 ¥ 173 i 189 J 205 = 221 237 ↓ 142 Ä 158 P 174 190 206 4 222 238 c	134	<mark>å</mark> 15	0 <mark>û</mark>	166		182	-i-	198	١Ę.	214	T	230	μ	246	÷
136 ê 152 ÿ 168 \wr 184 \neg 200 \blacksquare 216 \ddagger 232 $Φ$ 137 ê 153 Ö 169 $⊓$ 185 \ddagger 201 $⊓$ 217 J 233 \boxdot 138 è 154 Ü 170 \neg 186 202 \blacksquare 218 $⊓$ 234 $Ω$ 139 i 155 \circ 171 $\frac{1}{2}$ 187 \neg 203 \overrightarrow{rr} 219 235 δ 140 i 156 £ 172 $\frac{1}{4}$ 188 \exists 204 \models 220 236 ∞ 141 i 157 ¥ 173 i 189 \exists 205 = 221 237 ϕ 142 Ä 158 P 174 $"$ 190 d 206 $d =$ 222 238 c	135	<mark>ç</mark> 15	1 ù	167	•	183	п	199	I.	215	-	231	τ	247	æ
137 \ddot{e} 153 \ddot{O} 169 r 185 \ddot{f} 201 \vec{r} 217 J 233 \odot 138 \dot{e} 154 \ddot{U} 170 \neg 186 202 \bot 218 r 234 Ω 139 i 155 \circ 171 $\frac{4}{2}$ 187 $\overrightarrow{1}$ 203 \overrightarrow{r} 219 235 δ 140 i 156 \pounds 172 $\frac{4}{4}$ 188 J 204 \downarrow 220 236 ∞ 141 i 157 $\overleftarrow{\mp}$ 173 i 189 J 205 $=$ 221 237 ϕ 142 \ddot{A} 158 P 174 (r) 190 d 206 d_{a} 222 238 c	136	<mark>ê</mark> 15:	2 ÿ	168	2	184	(ja)	200	Ľ	216	ŧ	232	Φ	248	•
138 è 154 Ü 170 186 202 218 234 Ω 139 i 155 ¢ 171 12 187 203 $\overline{\mathbf{r}}$ 219 235 δ 140 i 156 £ 172 14 188 204 \mathbf{F} 220 236 ∞ 141 i 157 ¥ 173 i 189 205 = 221 237 ϕ 142 Ä 158 P 174 (190) d 206 d 222 238 c	137	<mark>ë</mark> 15	3 Ö	169	Ē	185	4	201	F	217	j.	233	۲	249	
139 i 155 \circ 171 $\frac{4}{2}$ 187 i 203 iii 219 235 δ 140 i 156 £ 172 $\frac{4}{4}$ 188 J 204 $\frac{1}{2}$ 220 236 ∞ 141 i 157 ¥ 173 i 189 J 205 = 221 237 ϕ 142 Ä 158 P 174 (i 190 d 206 4 222 238 s	138	è 15	4 Ü	170	4	186	СÎ.	202	<u>JL</u>	218	E.	234	Ω	250	
140 $\hat{\mathbf{i}}$ 156 $\boldsymbol{\ell}$ 172 $\boldsymbol{i4}$ 188 $\hat{\mathbf{j}}$ 204 $\hat{\mathbf{j}}$ 220 236 ∞ 141 $\hat{\mathbf{i}}$ 157 $\boldsymbol{\overline{\mathbf{i}}}$ 173 $\hat{\mathbf{i}}$ 189 $\hat{\mathbf{j}}$ 205 $=$ 221 237 $\boldsymbol{\phi}$ 142 $\hat{\mathbf{j}}$ 158 \mathbf{p} 174 $(\boldsymbol{i}$ 190 \mathbf{j} 206 \mathbf{j} 222 238 \boldsymbol{s}	139	<mark>i</mark> 15.	5 ¢	171	1/2	187	-	203	ㅠ	219	i i i	235	δ	251	1
141 i 157 ¥ 173 j 189 J 205 = 221 237 ϕ 142 Ä 158 P 174 (190 J 206 4 222 238 s	140	î 15	6 <mark>£</mark>	172	3/4	188	ц. Ц	204	 ⊫	220		236	80	252	ъ
142 Ä 158 p 174 « 190 d 206 d 202 238 s	141	i 15	7 ¥	173	i	189	Ш	205	=	221	- î	237	φ	253	2
	142	Ä 15	8 🔒	174		190	Ш	206	÷	222	- i - i	238	ε	254	
143 Å 159 f 175 » 191 - 207 4 223 239	143	Å 15	9 <u>7</u>	175	>>	191		207	÷.	223		239	0	255	
Source: www.Look			1				1				Source:	www	. Looku	pTable	s.com

ASCII VALUES

Dec	H	Oct	Char		Dec	Hx	Oct	Html	Chr	Dec	Hx	Oct	Html	Chr	Dec	Нx	Oct	Html Chr
0	0	000	NUL	(null)	32	20	040	∉# 32;	Space	64	40	100	<u>4</u> #64;	0	96	60	140	«#96; `
1	1	001	SOH	(start of heading)	33	21	041	&# 33;	1	65	41	101	«#65;	A	97	61	141	≪#97; <mark>a</mark>
2	2	002	STX	(start of text)	34	22	042	&#34;</td><td></td><td>66</td><td>42</td><td>102</td><td>B</td><td>В</td><td>98</td><td>62</td><td>142</td><td>≪#98; b</td></tr><tr><td>3</td><td>3</td><td>003</td><td>ETX</td><td>(end of text)</td><td>35</td><td>23</td><td>043</td><td>&#35;</td><td>#</td><td>67</td><td>43</td><td>103</td><td>«#67;</td><td>C</td><td>99</td><td>63</td><td>143</td><td>≪#99; C</td></tr><tr><td>4</td><td>4</td><td>004</td><td>EOT</td><td>(end of transmission)</td><td>36</td><td>24</td><td>044</td><td>&#36;</td><td>ę –</td><td>68</td><td>44</td><td>104</td><td>∉68;</td><td>D</td><td>100</td><td>64</td><td>144</td><td>≪#100; <mark>d</mark></td></tr><tr><td>5</td><td>5</td><td>005</td><td>ENQ</td><td>(enquiry)</td><td>37</td><td>25</td><td>045</td><td>∉#37;</td><td>*</td><td>69</td><td>45</td><td>105</td><td>«#69;</td><td>Е</td><td>101</td><td>65</td><td>145</td><td>≪#101; e</td></tr><tr><td>6</td><td>6</td><td>006</td><td>ACK</td><td>(acknowledge)</td><td>38</td><td>26</td><td>046</td><td>∉38;</td><td>6</td><td>70</td><td>46</td><td>106</td><td>F</td><td>F</td><td>102</td><td>66</td><td>146</td><td>≪#102;</td></tr><tr><td>7</td><td>7</td><td>007</td><td>BEL</td><td>(bell)</td><td>39</td><td>27</td><td>047</td><td>&#39;</td><td>1.00</td><td>71</td><td>47</td><td>107</td><td>G</td><td>G</td><td>103</td><td>67</td><td>147</td><td>≪#103; g</td></tr><tr><td>8</td><td>8</td><td>010</td><td>BS</td><td>(backspace)</td><td>40</td><td>28</td><td>050</td><td>‰#40;</td><td>(</td><td>72</td><td>48</td><td>110</td><td>H</td><td>н</td><td>104</td><td>68</td><td>150</td><td>∝#104; h</td></tr><tr><td>9</td><td>9</td><td>011</td><td>TAB</td><td>(horizontal tab)</td><td>41</td><td>29</td><td>051</td><td>)</td><td>)</td><td>73</td><td>49</td><td>111</td><td>¢#73;</td><td>I</td><td>105</td><td>69</td><td>151</td><td>≪#105; <mark>i</mark></td></tr><tr><td>10</td><td>A</td><td>012</td><td>LF</td><td>(NL line feed, new line)</td><td>42</td><td>2A</td><td>052</td><td>*</td><td>*</td><td>74</td><td>4A</td><td>112</td><td>¢#74;</td><td>J</td><td>106</td><td>6A</td><td>152</td><td>≪#106; j</td></tr><tr><td>11</td><td>В</td><td>013</td><td>VT</td><td>(vertical tab)</td><td>43</td><td>2B</td><td>053</td><td>«#43;</td><td>+</td><td>75</td><td>4B</td><td>113</td><td>∝#75;</td><td>K</td><td>107</td><td>6B</td><td>153</td><td>≪#107; k</td></tr><tr><td>12</td><td>С</td><td>014</td><td>FF</td><td>(NP form feed, new page)</td><td>44</td><td>2C</td><td>054</td><td>s#44;</td><td>1.</td><td>76</td><td>4C</td><td>114</td><td>L</td><td>L</td><td>108</td><td>6C</td><td>154</td><td>≪#108; <mark>1</mark></td></tr><tr><td>13</td><td>D</td><td>015</td><td>CR</td><td>(carriage return)</td><td>45</td><td>2D</td><td>055</td><td>&#45;</td><td></td><td>77</td><td>4D</td><td>115</td><td>∝#77;</td><td>М</td><td>109</td><td>6D</td><td>155</td><td>≪#109; ™</td></tr><tr><td>14</td><td>Е</td><td>016</td><td>S0 -</td><td>(shift out)</td><td>46</td><td>2E</td><td>056</td><td>.</td><td>A. U. Y</td><td>78</td><td>4E</td><td>116</td><td>∉78;</td><td>N</td><td>110</td><td>6E</td><td>156</td><td>∝#110; <mark>n</mark></td></tr><tr><td>15</td><td>F</td><td>017</td><td>SI</td><td>(shift in)</td><td>47</td><td>2F</td><td>057</td><td>6#47;</td><td>1</td><td>79</td><td>4F</td><td>117</td><td>∉#79;</td><td>0</td><td>111</td><td>6F</td><td>157</td><td>≪#111; O</td></tr><tr><td>16</td><td>10</td><td>020</td><td>DLE</td><td>(data link escape)</td><td>48</td><td>30</td><td>060</td><td>&#48;</td><td>0</td><td>80</td><td>50</td><td>120</td><td>∉#80;</td><td>Р</td><td>112</td><td>70</td><td>160</td><td>≪#112; p</td></tr><tr><td>17</td><td>11</td><td>021</td><td>DC1</td><td>(device control 1)</td><td>49</td><td>31</td><td>061</td><td>1</td><td>1</td><td>81</td><td>51</td><td>121</td><td>¢#81;</td><td>Q</td><td>113</td><td>71</td><td>161</td><td>≪#113; <mark>q</mark></td></tr><tr><td>18</td><td>12</td><td>022</td><td>DC2</td><td>(device control 2)</td><td>50</td><td>32</td><td>062</td><td>&#50;</td><td>2</td><td>82</td><td>52</td><td>122</td><td>∉#82;</td><td>R</td><td>114</td><td>72</td><td>162</td><td>≪#114; r</td></tr><tr><td>19</td><td>13</td><td>023</td><td>DC3</td><td>(device control 3)</td><td>51</td><td>33</td><td>063</td><td>3</td><td>3</td><td>83</td><td>53</td><td>123</td><td>∉#83;</td><td>S</td><td>115</td><td>73</td><td>163</td><td>≪#115; S</td></tr><tr><td>20</td><td>14</td><td>024</td><td>DC4</td><td>(device control 4)</td><td>52</td><td>34</td><td>064</td><td>&#52;</td><td>4</td><td>84</td><td>54</td><td>124</td><td>∉#84;</td><td>Т</td><td>116</td><td>74</td><td>164</td><td>≪#116; t</td></tr><tr><td>21</td><td>15</td><td>025</td><td>NAK</td><td>(negative acknowledge)</td><td>53</td><td>35</td><td>065</td><td>∉#53;</td><td>5</td><td>85</td><td>55</td><td>125</td><td>∉#85;</td><td>U</td><td>117</td><td>75</td><td>165</td><td>≪#117; <mark>u</mark></td></tr><tr><td>22</td><td>16</td><td>026</td><td>SYN</td><td>(synchronous idle)</td><td>54</td><td>36</td><td>066</td><td>&#54;</td><td>6</td><td>86</td><td>56</td><td>126</td><td>∉#86;</td><td>V</td><td>118</td><td>76</td><td>166</td><td>≪#118; V</td></tr><tr><td>23</td><td>17</td><td>027</td><td>ETB</td><td>(end of trans. block)</td><td>55</td><td>37</td><td>067</td><td>&#55;</td><td>7</td><td>87</td><td>57</td><td>127</td><td>∉#87;</td><td>W</td><td>119</td><td>77</td><td>167</td><td>≪#119; ₩</td></tr><tr><td>24</td><td>18</td><td>030</td><td>CAN</td><td>(cancel)</td><td>56</td><td>38</td><td>070</td><td>∝#56;</td><td>8</td><td>88</td><td>58</td><td>130</td><td>∉#88;</td><td>Х</td><td>120</td><td>78</td><td>170</td><td>≪#120; ×</td></tr><tr><td>25</td><td>19</td><td>031</td><td>EM</td><td>(end of medium)</td><td>57</td><td>39</td><td>071</td><td>∝#57;</td><td>9</td><td>89</td><td>59</td><td>131</td><td>∉#89;</td><td>Y</td><td>121</td><td>79</td><td>171</td><td>≪#121; ¥</td></tr><tr><td>26</td><td>1A</td><td>032</td><td>SUB</td><td>(substitute)</td><td>58</td><td>ЗA</td><td>072</td><td>∉\$58;</td><td>÷</td><td>90</td><td>5A</td><td>132</td><td>∉#90;</td><td>Z</td><td>122</td><td>7A</td><td>172</td><td>≪#122; <mark>Z</mark></td></tr><tr><td>27</td><td>1B</td><td>033</td><td>ESC</td><td>(escape)</td><td>59</td><td>ЗB</td><td>073</td><td>∝#59;</td><td>2 - C</td><td>91</td><td>5B</td><td>133</td><td>∉#91;</td><td>[</td><td>123</td><td>7B</td><td>173</td><td>≪#123; {</td></tr><tr><td>28</td><td>1C</td><td>034</td><td>FS</td><td>(file separator)</td><td>60</td><td>ЗC</td><td>074</td><td>&#60;</td><td><</td><td>92</td><td>5C</td><td>134</td><td>∉#92;</td><td>Λ.</td><td>124</td><td>7C</td><td>174</td><td>≪#124; </td></tr><tr><td>29</td><td>1D</td><td>035</td><td>GS</td><td>(group separator)</td><td>61</td><td>ЗD</td><td>075</td><td>&#6l;</td><td>=</td><td>93</td><td>5D</td><td>135</td><td>∉#93;</td><td>]</td><td>125</td><td>7D</td><td>175</td><td>} }</td></tr><tr><td>30</td><td>lE</td><td>036</td><td>RS</td><td>(record separator)</td><td>62</td><td>ЗE</td><td>076</td><td>&#62;</td><td>></td><td>94</td><td>5E</td><td>136</td><td>∉94;</td><td>^</td><td>126</td><td>7E</td><td>176</td><td>≪#126; ~</td></tr><tr><td>31</td><td>lF</td><td>037</td><td>US</td><td>(unit separator)</td><td>63</td><td>ЗF</td><td>077</td><td>∉#63;</td><td>2</td><td>95</td><td>5F</td><td>137</td><td>∉#95;</td><td>_</td><td>127</td><td>7F</td><td>177</td><td> DEL</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>5</td><td>ourc</td><td>e: w</td><td>ww.</td><td>Look</td><td>upTables.com</td></tr></tbody></table>										

• What are some critical characters when reading/writing files?

• Code VB • 009 \rightarrow TAB \rightarrow vbTab • 013 \rightarrow CHR \rightarrow vbCr • 010 \rightarrow LF \rightarrow vbLf

• vbCr & vbLf \rightarrow vbCrLf

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ASCII CHARACTER SET

• A numeric representation for every key on the keyboard and for other assorted characters.

32 (space)	48 0	66 B	122 z
33 !	49 1	90 Z	123 {
34"	57 9	97 a	125 }
35 #	65 A	98 b	126 ~

ASCII CHARACTER SET: CONTINUED

• A numeric representation for every key on the keyboard and for other assorted characters.

162 ¢	177 ±	181 µ	190 ¼
169 ©	178 ²	188 1/4	247 ÷
176 °	179 ³	189 1/2	248 ø

CHR FUNCTION

For n between 0 and 255,

Chr(n)

is the string consisting of the character with ASCII value n.

EXAMPLES Chr(65) is "A" Chr(162) is "¢"

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ASC FUNCTION

For a string *str*,

Asc(str)

is ASCII value of the first character of *str*.

EXAMPLES Asc("A") is 65 Asc("¢25") is 162

4.1 – PART 2 – LOGICAL OPERATORS

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LOGICAL OPERATORS

- < less than
- <= less than or equal to
- > greater than
- >= greater than or equal to
- = equal to
- <> not equal to

ASCII values are used to decide order for strings.

CONDITION

- Decisions are a result of evaluating a condition
- A *condition* is an expression involving relational and/or logical operators
- Result of the condition is Boolean

???





TRUE?

ANOTHER EXAMPLE

a = 4 b = 3 c = "hello" d = "bye"(c.Length – b) = (a/2)







RELATIONAL OPERATOR NOTES

- Relational operators are binary they require an operand on both sides of the operator
- Value of a relational expression will always be *True* or *False*
- Expressions are evaluated from left to right with no order of operations

LOGICAL OPERATORS

- Used with Boolean expressions
- Not makes a False expression True and vice versa
- And will yield a *True* if and only if both expressions are *True*
- *Or* will yield a *True* if at least one of both expressions are *True*



$$n = 4$$
, answer = "Y"

Are the following expressions true or false?

Not (n < 6)
 (answer = "Y") Or (answer = "y")
 (answer = "Y") And (answer = "y")
 answer = "y")

BOOLEAN EXPRESSION

- An expression that evaluates to either True or False is said to have Boolean data type.
- Example:

The statement

txtBox.Text = CStr((2+3)<6)

displays **True** in the text box.

BOOLEAN VARIABLE

- A variable declared with a statement of the form **Dim var As Boolean**
- is said to have Boolean data type. It can assume just the two values True and False.
- Example:
 - Dim boolVar As Boolean

boolVar = 2 < 6

txtBox.Text = CStr(boolVar)

What's the result?

SYNTAX ERROR

The following is NOT a valid way to test if *n* falls between 2 and 5:

(2 < n < 5)

CORRECTION TO SYNTAX ERROR

To test if n falls between 2 and 5 use:

(2 < n) And (n < 5)

A complete relational expression must be on either side of the logical operators And and Or.

COMMON ERROR IN BOOLEAN EXPRESSIONS

• A common error is to replace the condition

Not (2 < 3)

with the condition

(2 > 3)

What's wrong??

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4.2 IF BLOCKS

If Block ElseIf Clauses

IF BLOCK

The program will take a course of action based on whether a condition is true.



ANOTHER EXAMPLE IF BLOCK

If condition Then action1 End If Statement2 Statement3

alse, these statements will be executed

PSEUDOCODE/FLOWCHART FOR AN IF BLOCK



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EXAMPLE 1: FORM



🖳 Maximum 💼 💷 💽
First number:
Second number:
Find Larger Number

EXAMPLE 1: CODE

Private Sub btnFindLarger_Click(...) Handles btnFindLarger.Click Dim num1, num2, largerNum As Double num1 = CDb1(txtFirstNum.Text) num2 = CDbl(txtSecondNum.Text) If num1 > num2 Then largerNum = num1 What happens? Else largerNum = num2 End If txtResult.Text = "The larger number is " & largerNum End Sub

EXAMPLE 1: OUTPUT

Haximum
First number: 3
Second number: 7
Find Larger Number
The larger number is 7.

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EXAMPLE 2: FORM

🖳 Profit/Loss 🛛	- • ×
Costs:	
Revenue:	
Show Finance	cial Status

EXAMPLE 2: PARTIAL CODE

```
🖳 Profit/Loss 🗖 🔲 📈
   What happens?
                                           Costs:
                                         Revenue:
If costs = revenue Then
                                         Show Financial Status
  txtResult.Text = "Break even"
Else
  If costs < revenue Then
    profit = revenue - costs
    txtResult.Text = "Profit is " &
                       FormatCurrency(profit) & "."
  Else
    loss = costs - revenue
    txtResult.Text = "Loss is " &
                       FormatCurrency(loss) & "."
  End If
```

End If

EXAMPLE 2: OUTPUT

Profit/Loss
Costs: 9500
Revenue: 8000
Show Financial Status
Loss is \$1,500.00.

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EXAMPLE 3: FORM



EXAMPLE 3: CODE

Private Sub btnEvaluate_Click(...) Handles btnEvaluate.Click

```
Dim answer As Double
```

```
answer = CDbl(txtAnswer.Text)
```

If (answer >= 0.5) And (answer <= 1) Then

txtSolution.Text = "Good, '

txtSolution.Text = "No,

```
Else
```

```
What happens?
```

```
End If
```

```
txtSolution.Text &= "it holds about 3/4 of"
```

& " a gallon."

```
End Sub
```



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EXAMPLE 3: OUTPUT



EXAMPLE 4: FORM



EXAMPLE 4

```
Private Sub btnDisplay_Click(...) _____
```

Handles btnDisplay.Click

```
Dim message As String
```

```
message = "Skittles is an old form of bowling in "
```

- & "which a wooden disk is used to knock down nine"
- & " pins arranged in a square."
- If txtAnswer.Text.ToUpper = "N" Then

MessageBox.Show(message, "")

End If

```
txtQuote.Text = "Life ain't all beer and skittles."
txtQuote.Text &= " - Du Maurier (1894)."
```

End Sub



What happens?

EXAMPLE 4: OUTPUT

Quotation	
Do you know what the game of skittles is (Y/N)? $\rm N$	
Display Quotation	
Life ain't all beer and skittles Du Maurier (1894)	
Definition	×
Skittles is an old form of bowling in which a wooder nine pins arranged in a square.	n disk is used to knock down
	ОК

EXAMPLE 4: OUTPUT CONTINUED



ELSEIF CLAUSE

If condition1 Then action1 Elself condition2 Then action2 Elself condition3 Then action3 Else action4 End If

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EXAMPLE 5: FORM

🖳 Maximum 📃 🖃 🎫	
First number:	txtFirstNum
Second number:	txtSecondNum
Find Larger Number	
	txtResult

EXAMPLE 5: CODE

```
Dim num1, num2 As Double
num1 = CDbl(txtFirstNum.Text)
num2 = CDbl(txtSecondNum.Text)
If (num1 > num2) Then
   txtResult.Text = "Larger number is " & num1
ElseIf (num2 > num1) Then
   txtResult.Text = "Larger number is " & num2
Else
```

```
txtResult.Text = "The two are equal."
```

End If

End Sub

What happens?

🖳 Maximum 👝 💷 🎫
First number:
Second number:
Find Larger Number

🖳 FICA Taxes



Total earnings for this year prior to the current pay period:

Earnings for the current pay period:

Calculate FICA Taxes

FICA taxes for the current pay period:

EXAMPLE 6: FORM

EXAMPLE 6: PARTIAL CODE

```
Dim ytdEarnings, curEarnings As Double
Dim socSecBenTax, medicareTax, ficaTaxes As Double
ytdEarnings = CDbl(txtToDate.Text)
curEarnings = CDbl(txtCurrent.Text)
If (ytdEarnings + curEarnings) <= 102000 Then
   socSecBenTax = 0.062 * curEarnings
ElseIf ytdEarnings < 102000 Then
  socSecBenTax = 0.062 * (102000 - ytdEarnings)
End If
medicareTax = 0.0145 * curEarnings
ficaTaxes = socSecBenTax + medicareTax
txtText.Text = FormatCurrency(ficaTaxes)
End Function
```

What happens?



EXAMPLE 6: OUTPUT





- When one If block is contained inside another If block, the structure is referred to as **nested If blocks**.
- Care should be taken to make **If** blocks easy to understand.

SIMPLIFIED NESTED IF STATEMENT

If cond1 Then	If cond1 And cond2 Then
If cond2 Then	action
action	End If
End If	
End If	



MORE COMMENTS

- Some programs call for selecting among many possibilities
- Can be accomplished with complicated nested **If** blocks
- *Select Case* block is often a better alternative

4.3 SELECT CASE BLOCKS

SELECT CASE BLOCK

- A decision-making structure that simplifies choosing among several actions.
- Avoids complex nested **If** constructs.
- If blocks make decisions based on the truth value of a condition. Select Case choices are determined by the value of an expression called a **selector**.

Select Case Terminology

Each of the possible actions is preceded by a clause of the form

Case valueList

where *valueList* itemizes the values of the **selector** for which the action should be taken.

EXAMPLE 1: FORM



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EXAMPLE 1: CODE

What happens?



EXAMPLE	1: (JUTP	UT
	_		-

Horse Race
Finishing position (1, 2, 3,): 2
Evaluate Position
Place

EXAMPLE 2: CODE

```
Private Sub btnEvaluate Click(...)
                       Handles btnEvaluate.Click
  Dim position As Integer = CInt(txtPosition.Text)
  Select Case position
    Case 1 To 3
      txtOutcome.Text = "In the money. Congratulations"
    Case Is >= 4
      txtOutcome.Text = "Not in the money."
 End Select
End Sub
```

```
What happens?
```

🖳 Horse Race 📃 🗖 💌		
Finishing position (1, 2, 3,):		
Evaluate Position		

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EXAMPLE 2: OUTPUT



SELECT CASE SYNTAX

The general form of the **Select Case** block is

Select Case selector Case valueList1 action1 Case valueList2 action2 Case Else action of last resort End Select

RULES FOR SELECT CASE

- **Case Else** (and its action) is optional
- Each value list contains one or more of the following types of items separated by commas:
 - 1. a literal (value);
 - 2. a variable;
 - 3. an expression;
 - 4. an inequality sign preceded by *Is* and followed by a literal, variable, or expression;
 - 5. a range expressed in the form *a* To *b*, where *a* and *b* are literals, variables, or expressions.



FLOWCHART FOR SELECT CASE

FLOWCHART FOR SELECT CASE

• (not in book, but equivalent)



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EXAMPLE 3: PARTIAL CODE

```
Dim x As Integer = 2, y As Integer = 3
Select Case num
  Case y - x, x
    txtPhrase.Text = "Buckle my shoe."
  Case Is \leq 4
    txtPhrase.Text = "Shut the door."
  Case x + y To x * y
    txtPhrase.Text = "Pick up sticks."
  Case 7, 8
    txtPhrase.Text = "Lay them straight."
  Case Else
     txtPhrase.Text = "Start all over again."
```

End Select

What happens?

EXAMPLE 4: FORM

🖳 Quiz		
What was President Wilson's first name?		
Interpret .	Answer	
	•	 txtReply

EXAMPLE 4: PARTIAL CODE

Select Case firstName Case "THOMAS" txtReply.Text = "Correct." Case "WOODROW" txtReply.Text = "Sorry, his name" & " was Thomas Woodrow Wilson." Case "PRESIDENT" txtReply.Text = "Are you for real?" Case Else txtReply.Text = "Nice try." End Select

What happens?

🖳 Quiz	
What was President Wilson's first name?	
Interpret Answer	

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EXAMPLE 4: OUTPUT



EXAMPLE 7: FORM

🖳 Seasons		
Season:		
Number of Days		

EXAMPLE 7: PARTIAL CODE

Dim season As String, numDays As Integer Select Case season.ToUpper

```
Case "WINTER"
```

```
numDays = 87
```

- Case "SPRING"
 - numDays = 92
- Case "SUMMER", "AUTUMN", "FALL"
 - numDays = 93

End Select

What happens?



EXAMPLE 7: FORM & OUTPUT

	Seasons 💷 🔍 🔀	J
	Season: Summer	
Number of Days		
s	ummer has 93 days.	



- In a Case clause of the form *Case b To c*, the value of *b* should be less than or equal to the value of *c*
- The word *Is* should precede an inequality sign in a value list

• If the word *Is* is accidentally omitted where required, the editor will automatically insert it when checking the line

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DATA TYPE COMMENT

- The items in the value list must evaluate to a literal of the same data type as the selector
- For instance, if the selector evaluated to a string value, as in

Dim firstName As String =
 txtBox.Text
Select Case firstName
 then the clause
Case firstName.Length
 would be meaningless.

BLOCK-LEVEL SCOPE

• A variable declared inside an If ... Then or Select Case block has block-level scope

• The variable cannot be referred to outside the block
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