Do NOT write on this test. Record all answers on the bubble sheet. **Closed book. No notes.** Work strictly from memory. **No calculators. No time limit. Scratch paper okay.**

UNIX: Which unix shell commands have what meaning? (If no match mark J.)

(A) `cap` (B) `del` (C) `gcc` (D) `md` (E) `mkdir` (F) `mv` (G) `ren` (H) `rename` (I) `rm`

1/8p. create a directory
2/8p. rename a file
3/8p. compile a program
4/8p. delete a file

UNIX: Which unix shell commands have what meaning? (If no match mark J.)

(A) `cat` (B) `emacs` (C) `list` (D) `rd` (E) `rmdir` (F) `top` (G) `type` (H) `w` (I) `who`

5/8p. return from shell-out
6/8p. type out a text file
7/8p. see who is logged in
8/8p. delete a directory

UNIX: Which unix shell commands have what meaning? (If no match mark J.)

(A) `cd` (B) `cwd` (C) `exit` (D) `pass` (E) `passwd` (F) `pwd` (G) `quit` (H) `rm` (I) `top`

9/8p. log out
10/8p. see what is running
11/8p. tell what directory you are in
12/8p. change your password

UNIX: Which unix shell commands have what meaning? (If no match mark J.)

(A) `cat` (B) `df` (C) `dir` (D) `du` (E) `emacs` (F) `full` (G) `ls` (H) `space` (I) `volume`

13/8p. edit a file
14/8p. see how much disk space you are using
15/8p. see how full the disks are
16/8p. show the contents of the directory

EMACS: Which emacs commands have what meaning? (If no match mark J.)

(A) `C-` (C) `C-g` (E) `C-p` (G) `C-x C-f` (I) `C-y`
(B) `C-a` (D) `C-n` (F) `C-u` (H) `C-x C-s`

17/5p. paste back what was deleted
18/5p. go to previous line (up 1)
19/5p. go to start of line
20/5p. save current buffer, same filename
21/5p. hold down CTRL

EMACS: Which emacs commands have what meaning? (If no match mark J.)

(A) `C-b` (C) `C-n` (E) `C-x C-f` (G) `C-x C-q` (I) `C-x o`
(B) `C-f` (D) `C-x C-c` (F) `C-x C-l` (H) `C-x n`

22/5p. jump to next window
23/5p. exit/quit
24/5p. load a new file
25/5p. go to previous character (left 1)
26/5p. go to next character (right 1)

EMACS: Which emacs commands have what meaning? (If no match mark J.)

(A) `C-d` (C) `C-s` (E) `C-x C-i` (G) `C-y` (I) `M-x rmail`
(B) `C-n` (D) `C-x 2` (F) `C-x i` (H) `ESC-x rmail`

27/5p. open a second window
28/5p. insert a file
29/5p. run mail
30/5p. go to next line (down 1)

EMACS: Which emacs commands have what meaning? (If no match mark J.)

(A) `C-a` (C) `C-delete` (E) `C-p` (G) `C-x 0` (I) `C-x C-w`
(B) `C-d` (D) `C-h t` (F) `C-t` (H) `C-x 1`

31/5p. save-as current buffer, specify filename
32/5p. show the tutorial
33/5p. delete current character
34/5p. close all but current window

EMACS: Which emacs commands have what meaning? (If no match mark J.)

(A) `C-_` (C) `C-g` (E) `C-l` (G) `C-s` (I) `C-z`
(B) `C-c` (D) `C-k` (F) `C-r` (H) `C-u`

35/5p. cut to end of line
36/5p. undo last change
37/5p. center and redraw screen
38/5p. shell out

EMACS: Which emacs commands have what meaning? (If no match mark J.)

(A) `C-_` (C) `C-c` (E) `C-s` (G) `C-z` (I) `M-`
(B) `C-b` (D) `C-g` (F) `C-x` (H) `ESC-`

39/5p. press ESC first
40/5p. go to end of line
41/5p. cancel the command in progress
42/5p. start incremental search

Precedence: What is the value of each expression? Mark (I) for error, (J) for none of the above.

43/10p.	`2/8/5-8/3`	(A) -85	(B) -47	(C) -20	(D) -3	(E) -1	(F) 0	(G) 1	(H) 72
44/10p.	`1-9+5*0*7`	(A) -62	(B) -56	(C) 0	(D) 1	(E) 7	(F) 28	(G) 36	(H) 88
45/10p.	`3+2-2&&3>=3`	(A) -88	(B) -78	(C) -60	(D) 0	(E) 1	(F) 3	(G) 5	(H) 7
46/10p.	`7-1*8%6*8`	(A) -91	(B) -62	(C) -1	(D) 0	(E) 40	(F) 47	(G) 48	(H) 96
47/10p.	`2-1>1<=1-3`	(A) -59	(B) -23	(C) -3	(D) -1	(E) 0	(F) 1	(G) 2	(H) 5
48/10p.	`7*5%8%7-7`	(A) -49	(B) -48	(C) -14	(D) -7	(E) -4	(F) -1	(G) 22	(H) 78
49/10p.	`3-9-6==5&&4`	(A) -66	(B) -12	(C) -6	(D) 0	(E) 1	(F) 3	(G) 39	(H) 49
50/10p.	`8/7==6>=3-8`	(A) -93	(B) -8	(C) -7	(D) -1	(E) 0	(F) 1	(G) 8	(H) 40
51/10p.	`6+7>1==7+5`	(A) -79	(B) -13	(C) 0	(D) 1	(E) 5	(F) 11	(G) 12	(H) 37
52/10p.	`3+1<=0&&3*6`	(A) -78	(B) -1	(C) 0	(D) 1	(E) 3	(F) 15	(G) 18	(H) 71
53/10p.	`0%7-9-5+1`	(A) -41	(B) -15	(C) -13	(D) -9	(E) -6	(F) -5	(G) 0	(H) 1
54/10p.	`7-1*5%6/2`	(A) -70	(B) -8	(C) 0	(D) 1	(E) 5	(F) 15	(G) 26	(H) 53
55/10p.	`3-0+6/6-1`	(A) -75	(B) -10	(C) 0	(D) 1	(E) 2	(F) 3	(G) 4	(H) 81
56/10p.	`2/5>=7||1-8`	(A) -78	(B) -8	(C) -7	(D) -6	(E) -2	(F) -1	(G) 0	(H) 2
57/10p.	`2%2||6<=5+3`	(A) -85	(B) -15	(C) 0	(D) 1	(E) 3	(F) 4	(G) 63	(H) 83
58/10p.	`5%8/4+2-4`	(A) -20	(B) -4	(C) -3	(D) -1	(E) 2	(F) 5	(G) 15	(H) 62
59/10p.	`9/1%6+4-3`	(A) -66	(B) -12	(C) -2	(D) 4	(E) 6	(F) 9	(G) 10	(H) 18
60/10p.	`8>5!=2*8+9`	(A) -37	(B) -30	(C) -15	(D) 1	(E) 9	(F) 10	(G) 17	(H) 78
61/10p.	`5%4*4*7/3`	(A) -33	(B) -11	(C) 1	(D) 5	(E) 8	(F) 9	(G) 10	(H) 58
62/10p.	`8-4==7>9-1`	(A) -41	(B) -25	(C) -1	(D) 0	(E) 7	(F) 9	(G) 50	(H) 96
63/10p.	`2-5-4||2>=5`	(A) -90	(B) -4	(C) -3	(D) -2	(E) 0	(F) 1	(G) 27	(H) 41
64/10p.	`3/1%4+1-3`	(A) -46	(B) -3	(C) -2	(D) 0	(E) 3	(F) 11	(G) 30	(H) 40
65/10p.	`5/7==9||5-3`	(A) -99	(B) -3	(C) 0	(D) 1	(E) 2	(F) 5	(G) 27	(H) 46
66/10p.	`6+2/1%6*2`	(A) -78	(B) 4	(C) 8	(D) 10	(E) 16	(F) 51	(G) 77	(H) 81
67/10p.	`5+4+5%4*7`	(A) -95	(B) -10	(C) 12	(D) 14	(E) 16	(F) 40	(G) 42	(H) 70

How many times does the body of the loop execute? (Mark 9 if 9 or more.)

68/10p. `int h=-10; do body; while( h++ != -17 );`

69/10p. `int u; for( u=-8; u<=-8; u++ ) body;`

70/10p. `int x=-3; while( x++ < 3 ) body;`

71/10p. `int g=-3; do body; while( g++ > -7 );`

72/10p. `int x=-9; while( ++x < -1 ) body;`

73/10p. `int c; for( c=7; c>=5; --c ) body;`

74/10p. `int a=9; do body; while( a++ <= 11 );`

75/10p. `int k=2; while( ++k > -1 ) body;`

76/10p. `int i=4; do body; while( i++ >= 1 );`

77/10p. `int g; for( g=6; g>=6; g-- ) body;`

78/10p. `int x; for( x=7; x!=9; x++ ) body;`

79/10p. `int g=6; do body; while( g-- >= 7 );`

80/10p. `int c; for( c=2; c<=5; ++c ) body;`

81/10p. `int c; for( c=-1; c!=6; --c ) body;`

82/10p. `int n=-8; while( ++n < -1 ) body;`

83/10p. `int b; for( b=-9; b<-5; b++ ) body;`

84/10p. `int t=3; do body; while( ++t < 5 );`

85/10p. `int e=8; while( ++e != 11 ) body;`

86/10p. `int s=-7; do body; while( s-- != -13 );`

87/10p. `int k=10; while( ++k < 13 ) body;`

88/10p. `int i=-3; do body; while( --i > -6 );`

89/10p. `int d=4; while( d++ <= 3 ) body;`

90/10p. `int j=-10; do body; while( ++j <= -7 );`

91/10p. `int u=10; do body; while( --u != 17 );`

92/10p. `int b=2; do body; while( --b >= -5 );`

On the following printf questions you are given a list of inputs. For each problem line determine which printf statement created the accompanying outputs. (␣ means space.)

Which of these printf statements created the outputs shown for each problem below? (`x` is `int x;`)

(A) `printf("␣␣␣␣%+4d␣",x);` (D) `printf("␣␣␣%3d␣␣␣",x);` (G) `printf("␣␣%07d",x);`
(B) `printf("␣␣␣␣%0+3d␣␣",x);` (E) `printf("␣␣%␣4d␣␣␣",x);` (H) `printf("␣%-4d␣␣␣␣",x);`
(C) `printf("␣␣␣%+5d␣",x);` (F) `printf("␣␣%␣5d␣␣",x);` (I) `printf("␣%04d␣␣␣␣",x);`

inputs:	3	-3	1809109848	-1535487989
93/6p.	␣0003␣␣␣␣	␣-003␣␣␣␣	␣1809109848␣␣␣␣	␣-1535487989␣␣␣␣
94/6p.	␣3␣␣␣␣␣␣	␣-3␣␣␣␣␣␣	␣1809109848␣␣␣␣	␣-1535487989␣␣␣␣
95/6p.	␣␣␣␣␣␣+3␣	␣␣␣␣␣␣-3␣	␣␣␣␣+1809109848␣	␣␣␣␣-1535487989␣
96/6p.	␣␣␣␣+03␣␣	␣␣␣␣-03␣␣	␣␣␣␣+1809109848␣␣	␣␣␣␣-1535487989␣␣
97/6p.	␣␣0000003	␣␣-000003	␣␣1809109848	␣␣-1535487989

Which of these printf statements created the outputs shown for each problem below? (`x` is `int x;`)

(A) `printf("␣␣␣␣␣%␣03d",x);` (D) `printf("␣␣␣%03d␣␣",x);` (G) `printf("␣%␣5d␣␣",x);`
(B) `printf("␣␣␣%␣d␣␣␣␣",x);` (E) `printf("␣␣%6d",x);` (H) `printf("␣%-+6d␣",x);`
(C) `printf("␣␣␣%+-4d␣",x);` (F) `printf("␣%␣04d␣␣␣",x);` (I) `printf("␣%-7d",x);`

inputs:	5	-8	1559205611	-1690218804
98/6p.	␣␣␣␣5␣␣␣␣	␣␣␣-8␣␣␣␣	␣␣␣␣1559205611␣␣␣␣	␣␣␣-1690218804␣␣␣␣
99/6p.	␣+5␣␣␣␣␣	␣-8␣␣␣␣␣	␣+1559205611␣	␣-1690218804␣
100/6p.	␣5␣␣␣␣␣	␣-8␣␣␣␣␣	␣1559205611	␣-1690218804
101/6p.	␣␣␣␣␣␣05	␣␣␣␣␣-08	␣␣␣␣␣␣1559205611	␣␣␣␣␣-1690218804
102/6p.	␣␣␣+5␣␣␣	␣␣␣-8␣␣␣	␣␣␣+1559205611␣	␣␣␣-1690218804␣

Which of these printf statements created the outputs shown for each problem below? (`x` is `int x;`)

(A) `printf("␣␣␣%+04d␣",x);` (D) `printf("␣␣%␣d␣␣␣␣␣",x);` (G) `printf("␣%+-5d␣␣",x);`
(B) `printf("␣␣␣%-2d␣␣␣",x);` (E) `printf("␣␣%5d␣",x);` (H) `printf("␣%+-7d",x);`
(C) `printf("␣␣%␣05d␣",x);` (F) `printf("␣%␣06d␣",x);` (I) `printf("%-8d",x);`

inputs:	7	-5	1908521653	-1551282950
103/6p.	␣␣␣␣␣␣7␣	␣␣␣␣␣-5␣	␣␣1908521653␣	␣␣-1551282950␣
104/6p.	␣␣␣0007␣	␣␣-0005␣	␣␣␣1908521653␣	␣␣-1551282950␣
105/6p.	␣+7␣␣␣␣␣	␣-5␣␣␣␣␣	␣+1908521653	␣-1551282950
106/6p.	␣␣␣+007␣	␣␣␣-005␣	␣␣␣+1908521653␣	␣␣␣-1551282950␣
107/6p.	␣␣␣7␣␣␣␣␣	␣␣-5␣␣␣␣␣	␣␣␣1908521653␣␣␣␣␣	␣␣-1551282950␣␣␣␣␣

Which of these printf statements created the outputs shown for each problem below? (`x` is `int x;`)

(A) `printf("␣␣␣␣␣%+3d␣␣",x);` (D) `printf("␣␣%-+5d␣␣␣",x);` (G) `printf("␣%-␣9d",x);`
(B) `printf("␣␣␣%+4d␣␣␣",x);` (E) `printf("␣␣%-7d␣",x);` (H) `printf("%␣-10d",x);`
(C) `printf("␣␣␣%0␣6d␣",x);` (F) `printf("␣%␣3d␣␣␣␣␣␣",x);` (I) `printf("%10d",x);`

inputs:	4	-2	1109902860	-1462436094
108/6p.	␣4␣␣␣␣␣␣␣␣	-2␣␣␣␣␣␣␣␣	␣1109902860	-1462436094
109/6p.	␣␣␣␣␣+4␣␣␣	␣␣␣␣␣-2␣␣␣	␣␣␣+1109902860␣␣␣	␣␣␣-1462436094␣␣␣
110/6p.	␣␣4␣␣␣␣␣␣␣	␣-2␣␣␣␣␣␣␣	␣␣1109902860	␣-1462436094
111/6p.	␣␣4␣␣␣␣␣␣␣	␣␣-2␣␣␣␣␣␣	␣␣1109902860␣	␣␣-1462436094␣
112/6p.	␣␣␣␣00004␣	␣␣␣-00002␣	␣␣␣␣1109902860␣	␣␣␣-1462436094␣

Which of these printf statements created the outputs shown for each problem below? (x is `char * x;`)

(A) `printf("␣␣␣␣␣%s␣",x);` (D) `printf("␣%-3s␣␣",x);` (G) `printf("%3s␣␣␣",x);`
(B) `printf("␣␣␣␣%s␣␣",x);` (E) `printf("␣%-4s␣",x);` (H) `printf("%5s␣",x);`
(C) `printf("␣␣␣%1s␣␣",x);` (F) `printf("␣%4s␣",x);` (I) `printf("%6s",x);`

inputs:	""	"k"	"gk"	"dcbk"	"cdgwgh"	"jwhzzwcy"
113/6p.	␣␣␣␣␣␣	␣␣␣k␣␣	␣␣␣gk␣␣	␣␣␣dcbk␣␣	␣␣␣cdgwgh␣␣	␣␣␣jwhzzwcy␣␣
114/6p.	␣␣␣␣␣␣	␣␣k␣␣␣	␣gk␣␣␣	dcbk␣␣␣	cdgwgh␣␣␣	jwhzzwcy␣␣␣
115/6p.	␣␣␣␣␣␣	␣␣␣␣k␣	␣␣␣gk␣	␣dcbk␣	␣cdgwgh␣	␣jwhzzwcy␣
116/6p.	␣␣␣␣␣␣	␣␣␣␣␣k	␣␣␣␣gk	␣␣dcbk	cdgwgh	jwhzzwcy
117/6p.	␣␣␣␣␣␣	␣k␣␣␣␣	␣gk␣␣␣	␣dcbk␣	␣cdgwgh␣	␣jwhzzwcy␣

Which of these printf statements created the outputs shown for each problem below? (x is `char * x;`)

(A) `printf("␣␣%-2s",x);` (D) `printf("␣%2s␣",x);` (G) `printf("%-4s",x);`
(B) `printf("␣␣%1s␣",x);` (E) `printf("␣%3s",x);` (H) `printf("%1s␣␣␣",x);`
(C) `printf("␣␣%s␣␣",x);` (F) `printf("%-3s␣",x);` (I) `printf("%4s",x);`

inputs:	""	"l"	"dx"	"chwb"	"fqcdkz"	"gllxckhh"
118/6p.	␣␣␣␣	␣␣␣l	␣␣dx	␣chwb	␣fqcdkz	␣gllxckhh
119/6p.	␣␣␣␣	␣␣l␣	␣dx␣	␣chwb␣	␣fqcdkz␣	␣gllxckhh␣
120/6p.	␣␣␣␣	␣␣l␣	␣␣dx␣	␣␣chwb␣	␣␣fqcdkz␣	␣␣gllxckhh␣
121/6p.	␣␣␣␣	l␣␣␣	dx␣␣␣	chwb␣␣␣	fqcdkz␣␣␣	gllxckhh␣␣␣
122/6p.	␣␣␣␣	␣␣l␣	␣␣dx	␣␣chwb	␣␣fqcdkz	␣␣gllxckhh

Which of these printf statements created the outputs shown for each problem below? (x is `double x;`)

(A) `printf("␣␣␣%+10.2f␣",x);` (D) `printf("%+14f",x);` (G) `printf("%013.4f␣",x);`
(B) `printf("␣%012f␣",x);` (E) `printf("%0+12.2f␣␣",x);` (H) `printf("%13.4f␣",x);`
(C) `printf("␣%013.0f",x);` (F) `printf("%013.2f␣",x);` (I) `printf("%14.0f",x);`

inputs:	3	3.59	-2.4956	-19690.945275
123/6p.	␣␣␣␣␣␣␣␣␣␣␣␣␣3	␣␣␣␣␣␣␣␣␣␣␣␣␣4	␣␣␣␣␣␣␣␣␣␣␣␣-2	␣␣␣␣␣␣␣␣-19691
124/6p.	00000003.0000␣	00000003.5900␣	-0000002.4956␣	-0019690.9453␣
125/6p.	␣␣␣␣␣␣␣␣+3.00␣	␣␣␣␣␣␣␣␣+3.59␣	␣␣␣␣␣␣␣␣-2.50␣	␣␣␣␣-19690.95␣
126/6p.	␣0000000000003	␣0000000000004	␣-000000000002	␣-000000019691
127/6p.	␣␣␣␣␣␣␣3.0000␣	␣␣␣␣␣␣␣3.5900␣	␣␣␣␣␣␣-2.4956␣	␣␣-19690.9453␣

Which of these printf statements created the outputs shown for each problem below? (x is `double x;`)

(A) `printf("␣␣%+10f␣␣",x);` (D) `printf("␣␣%011f␣",x);` (G) `printf("%014.0f",x);`
(B) `printf("␣␣%+12.2f",x);` (E) `printf("␣%+13.6f",x);` (H) `printf("%14.0f",x);`
(C) `printf("␣␣%0+11f␣",x);` (F) `printf("␣%0+13.6f",x);` (I) `printf("%14f",x);`

inputs:	4	3.02	-3.3877	-16426.347826
128/6p.	␣␣␣+4.000000␣␣	␣␣␣+3.020000␣␣	␣␣␣-3.387700␣␣	␣␣-16426.347826␣␣
129/6p.	␣␣␣␣␣␣4.000000	␣␣␣␣␣␣3.020000	␣␣␣␣␣-3.387700	␣-16426.347826
130/6p.	␣␣␣␣␣␣␣␣␣␣␣␣␣4	␣␣␣␣␣␣␣␣␣␣␣␣␣3	␣␣␣␣␣␣␣␣␣␣␣-3	␣␣␣␣␣␣␣␣-16426
131/6p.	␣␣0004.000000␣	␣␣0003.020000␣	␣␣-003.387700␣	␣␣-16426.347826␣
132/6p.	␣␣␣␣␣␣␣␣␣+4.00	␣␣␣␣␣␣␣␣␣+3.02	␣␣␣␣␣␣␣␣␣-3.39	␣␣␣␣␣-16426.35

Total points 998.

Answer Key (points per line)

1 (8). E	45 (10). E (1)	89 (10). 0
2 (8). F	46 (10). J (-9)	90 (10). 4
3 (8). C	47 (10). E (0)	91 (10). 9
4 (8). I	48 (10). E (-4)	92 (10). 8
5 (8). J	49 (10). D (0)	93 (6). I
6 (8). A	50 (10). F (1)	94 (6). H
7 (8). H	51 (10). C (0)	95 (6). A
8 (8). E	52 (10). C (0)	96 (6). B
9 (8). C	53 (10). C (-13)	97 (6). G
10 (8). I	54 (10). E (5)	98 (6). B
11 (8). F	55 (10). F (3)	99 (6). H
12 (8). E	56 (10). J (1)	100 (6). I
13 (8). E	57 (10). D (1)	101 (6). A
14 (8). D	58 (10). D (-1)	102 (6). C
15 (8). B	59 (10). D (4)	103 (6). E
16 (8). G	60 (10). D (1)	104 (6). C
17 (5). I	61 (10). F (9)	105 (6). H
18 (5). E	62 (10). D (0)	106 (6). A
19 (5). B	63 (10). F (1)	107 (6). D
20 (5). H	64 (10). J (1)	108 (6). H
21 (5). A	65 (10). D (1)	109 (6). B
22 (5). I	66 (10). D (10)	110 (6). G
23 (5). D	67 (10). E (16)	111 (6). E
24 (5). E	68 (10). 9	112 (6). C
25 (5). A	69 (10). 1	113 (6). C
26 (5). B	70 (10). 6	114 (6). G
27 (5). D	71 (10). 9	115 (6). F
28 (5). F	72 (10). 7	116 (6). I
29 (5). I	73 (10). 3	117 (6). E
30 (5). B	74 (10). 4	118 (6). E
31 (5). I	75 (10). 9	119 (6). D
32 (5). D	76 (10). 9	120 (6). B
33 (5). B	77 (10). 1	121 (6). H
34 (5). H	78 (10). 2	122 (6). A
35 (5). D	79 (10). 1	123 (6). I
36 (5). A	80 (10). 4	124 (6). G
37 (5). E	81 (10). 9	125 (6). A
38 (5). I	82 (10). 6	126 (6). C
39 (5). I	83 (10). 4	127 (6). H
40 (5). J	84 (10). 2	128 (6). A
41 (5). D	85 (10). 2	129 (6). I
42 (5). E	86 (10). 7	130 (6). H
43 (10). J (-2)	87 (10). 2	131 (6). D
44 (10). J (-8)	88 (10). 3	132 (6). B

Total points 998.