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) `cat` (B) `catalog` (C) `cd` (D) `cwd` (E) `dir` (F) `du` (G) `emacs` (H) `pwd` (I) `space`

1/8p. tell what directory you are in
2/8p. see how much disk space you are using
3/8p. show the contents of the directory
4/8p. edit a file

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

(A) `cat` (B) `del` (C) `delete` (D) `list` (E) `ls` (F) `md` (G) `mkdir` (H) `top` (I) `type`

5/8p. create a directory
6/8p. see what is running
7/8p. type out a text file
8/8p. delete a file

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

(A) `df` (B) `du` (C) `exit` (D) `fg` (E) `gcc` (F) `quit` (G) `rd` (H) `rmdir` (I) `who`

9/8p. return from shell-out
10/8p. see who is logged in
11/8p. log out
12/8p. delete a directory

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

(A) `cap` (B) `full` (C) `gcc` (D) `mv` (E) `pass` (F) `passwd` (G) `pwd` (H) `ren` (I) `volume`

13/8p. see how full the disks are
14/8p. rename a file
15/8p. compile a program
16/8p. change your password

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

(A) `C-d` (C) `C-k` (E) `C-p` (G) `C-t` (I) `C-y`
(B) `C-g` (D) `C-n` (F) `C-s` (H) `C-x C-s`

17/5p. show the tutorial
18/5p. paste back what was deleted
19/5p. start incremental search
20/5p. save current buffer, same filename
21/5p. go to next line (down 1)

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

(A) `C-_` (C) `C-e` (E) `C-u` (G) `C-z` (I) `M-`
(B) `C-a` (D) `C-p` (F) `C-x C-w` (H) `ESC-`

22/5p. go to start of line
23/5p. go to previous line (up 1)
24/5p. press ESC first
25/5p. go to end of line
26/5p. undo last change

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

(A) `C-` (C) `C-g` (E) `C-x` (G) `C-x n` (I) `C-z`
(B) `C-c` (D) `C-s` (F) `C-x C-s` (H) `C-x o`

27/5p. hold down CTRL
28/5p. jump to next window
29/5p. cancel the command in progress
30/5p. shell out

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

(A) `C-b` (C) `C-delete` (E) `C-k` (G) `C-n` (I) `C-x C-w`
(B) `C-c` (D) `C-h t` (F) `C-l` (H) `C-x 2`

31/5p. cut to end of line
32/5p. delete current character
33/5p. open a second window
34/5p. save-as current buffer, specify filename

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

(A) `C-b` (C) `C-p` (E) `C-x 1` (G) `C-x C-i` (I) `C-x i`
(B) `C-l` (D) `C-x 0` (F) `C-x C-c` (H) `C-x C-q`

35/5p. exit/quit
36/5p. go to previous character (left 1)
37/5p. close all but current window
38/5p. insert a file

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

(A) `C-l` (C) `C-r` (E) `C-x C-l` (G) `ESC-x rmail` (I) `M-x rmail`
(B) `C-n` (D) `C-x C-f` (F) `C-y` (H) `M-`

39/5p. go to next character (right 1)
40/5p. center and redraw screen
41/5p. run mail
42/5p. load a new file

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

43/10p.	`2%7!=6!=8-4`	(A) -70	(B) -7	(C) -4	(D) -3	(E) 0	(F) 1	(G) 78	(H) 82
44/10p.	`7+3+0>5<8`	(A) -27	(B) -25	(C) 0	(D) 1	(E) 10	(F) 11	(G) 67	(H) 78
45/10p.	`7%3+8+0/2`	(A) -43	(B) 0	(C) 3	(D) 4	(E) 5	(F) 7	(G) 9	(H) 66
46/10p.	`4*0/6-1-4`	(A) -20	(B) -8	(C) -5	(D) -4	(E) 0	(F) 3	(G) 12	(H) 74
47/10p.	`3+7==8!=6-1`	(A) -33	(B) -1	(C) 0	(D) 1	(E) 2	(F) 3	(G) 4	(H) 77
48/10p.	`2-1%6*6*7`	(A) -28	(B) -6	(C) -5	(D) 1	(E) 7	(F) 35	(G) 42	(H) 90
49/10p.	`2/8-4-7-1`	(A) -12	(B) -10	(C) -8	(D) -6	(E) -2	(F) -1	(G) 0	(H) 2
50/10p.	`3+3/9/1+4`	(A) -62	(B) -56	(C) 3	(D) 4	(E) 6	(F) 7	(G) 43	(H) 85
51/10p.	`5*1<=3!=7*2`	(A) -84	(B) -43	(C) 1	(D) 2	(E) 5	(F) 10	(G) 22	(H) 30
52/10p.	`4-7<6>0-7`	(A) -6	(B) -3	(C) 0	(D) 1	(E) 3	(F) 4	(G) 11	(H) 44
53/10p.	`0-7<=6<=2+4`	(A) -72	(B) -4	(C) -1	(D) 0	(E) 1	(F) 3	(G) 4	(H) 85
54/10p.	`6/2!=1<6+9`	(A) -96	(B) 0	(C) 1	(D) 6	(E) 9	(F) 15	(G) 60	(H) 84
55/10p.	`2*9-5%3%9`	(A) -63	(B) -23	(C) -17	(D) 1	(E) 5	(F) 7	(G) 14	(H) 41
56/10p.	`3*5<3>=0*5`	(A) -65	(B) -3	(C) 1	(D) 3	(E) 15	(F) 25	(G) 28	(H) 92
57/10p.	`4*4-7==0<=2`	(A) -35	(B) -28	(C) 0	(D) 1	(E) 2	(F) 12	(G) 15	(H) 16
58/10p.	`2%8*3%7-3`	(A) -6	(B) -2	(C) -1	(D) 0	(E) 2	(F) 6	(G) 31	(H) 88
59/10p.	`5*8%9/2+4`	(A) 0	(B) 4	(C) 6	(D) 20	(E) 24	(F) 32	(G) 40	(H) 88
60/10p.	`3*5+7/7%3`	(A) -9	(B) 1	(C) 2	(D) 3	(E) 16	(F) 18	(G) 36	(H) 80
61/10p.	`7-2!=4&&6*9`	(A) -19	(B) -4	(C) -2	(D) 1	(E) 9	(F) 12	(G) 54	(H) 63
62/10p.	`5-1-2/6%9`	(A) -89	(B) -3	(C) 0	(D) 4	(E) 6	(F) 21	(G) 22	(H) 91
63/10p.	`9-5/4%1-5`	(A) -90	(B) -3	(C) -1	(D) 0	(E) 4	(F) 12	(G) 14	(H) 25
64/10p.	`5+2/5*9-6`	(A) -50	(B) -1	(C) 0	(D) 5	(E) 15	(F) 18	(G) 30	(H) 39
65/10p.	`7+5*1<5<4`	(A) -47	(B) -39	(C) -13	(D) 0	(E) 7	(F) 8	(G) 12	(H) 36
66/10p.	`4+5||0<=3*7`	(A) 0	(B) 1	(C) 5	(D) 6	(E) 7	(F) 11	(G) 36	(H) 47
67/10p.	`2/5-3-1-3`	(A) -7	(B) -5	(C) -3	(D) -1	(E) 0	(F) 1	(G) 3	(H) 14

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

68/10p. `int n; for( n=5; n<11; ++n ) body;`

69/10p. `int m=3; while( ++m != 12 ) body;`

70/10p. `int r; for( r=4; r!=4; r-- ) body;`

71/10p. `int k=-7; while( ++k <= -6 ) body;`

72/10p. `int b; for( b=7; b<=11; ++b ) body;`

73/10p. `int h=-7; while( h-- != -8 ) body;`

74/10p. `int v=-9; do body; while( v++ >= -14 );`

75/10p. `int g=-3; while( g-- >= -6 ) body;`

76/10p. `int e=9; while( ++e != 12 ) body;`

77/10p. `int z=-4; do body; while( z++ <= -1 );`

78/10p. `int c; for( c=0; c>-6; c-- ) body;`

79/10p. `int i=3; while( i++ <= 3 ) body;`

80/10p. `int g; for( g=3; g>0; --g ) body;`

81/10p. `int k; for( k=5; k>4; k-- ) body;`

82/10p. `int u=5; while( --u < 10 ) body;`

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

84/10p. `int k; for( k=4; k<12; ++k ) body;`

85/10p. `int m; for( m=4; m!=12; ++m ) body;`

86/10p. `int u; for( u=3; u>-2; u-- ) body;`

87/10p. `int k=-10; while( --k != -11 ) body;`

88/10p. `int c=-6; while( --c != -9 ) body;`

89/10p. `int p; for( p=9; p<=13; --p ) body;`

90/10p. `int c=-1; do body; while( c++ < -1 );`

91/10p. `int q=7; do body; while( ++q < 10 );`

92/10p. `int u; for( u=-4; u<-1; u++ ) body;`

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("␣␣␣%2d␣␣",x);` (D) `printf("␣%+4d␣␣",x);` (G) `printf("%␣07d",x);`
(B) `printf("␣␣%␣-4d␣",x);` (E) `printf("␣%+5d␣",x);` (H) `printf("%-6d␣",x);`
(C) `printf("␣␣%5d",x);` (F) `printf("␣%-␣6d",x);` (I) `printf("%07d",x);`

inputs:	5	-4	1123196911	-1241880820
93/6p.	5␣␣␣␣␣␣	-4␣␣␣␣␣	1123196911␣	-1241880820␣
94/6p.	␣␣␣5␣␣␣	␣␣-4␣␣␣	␣␣␣1123196911␣	␣␣-1241880820␣
95/6p.	0000005	-000004	1123196911	-1241880820
96/6p.	␣␣␣+5␣␣	␣␣␣-4␣␣	␣+1123196911␣␣	␣-1241880820␣␣
97/6p.	␣␣5␣␣␣␣	␣-4␣␣␣␣	␣␣1123196911	␣-1241880820

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("%␣-7d",x);`
(B) `printf("␣␣␣%+d␣␣␣",x);` (E) `printf("␣%0␣6d",x);` (H) `printf("%+4d␣␣␣",x);`
(C) `printf("␣␣%5d",x);` (F) `printf("␣%3d␣␣␣",x);` (I) `printf("%06d␣",x);`

inputs:	8	-6	1159488954	-1727752492
98/6p.	␣␣␣+8␣␣␣	␣␣␣-6␣␣␣	␣␣␣+1159488954␣␣␣	␣␣␣-1727752492␣␣␣
99/6p.	␣␣␣␣␣8␣	␣␣␣␣␣-6␣	␣␣1159488954␣	␣-1727752492␣
100/6p.	␣␣␣8␣␣␣	␣␣-6␣␣␣	␣1159488954␣␣␣	␣-1727752492␣␣␣
101/6p.	␣8␣␣␣␣␣	-6␣␣␣␣␣	␣1159488954	-1727752492
102/6p.	␣␣␣␣␣␣8	␣␣␣␣␣-6	␣␣1159488954	␣␣-1727752492

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

(A) `printf("␣␣␣␣%d␣␣␣",x);` (D) `printf("␣␣%-␣5d␣",x);` (G) `printf("␣%0␣5d␣␣",x);`
(B) `printf("␣␣␣%0␣4d␣",x);` (E) `printf("␣%+-4d␣␣␣",x);` (H) `printf("␣%4d␣␣␣",x);`
(C) `printf("␣␣␣%0+3d␣␣",x);` (F) `printf("␣%+7d",x);` (I) `printf("%␣8d",x);`

inputs:	7	-6	1397024760	-1555056901
103/6p.	␣␣␣7␣␣␣␣	␣␣-6␣␣␣␣	␣␣␣1397024760␣	␣␣-1555056901␣
104/6p.	␣␣␣␣␣␣␣+7	␣␣␣␣␣␣␣-6	␣+1397024760	␣-1555056901
105/6p.	␣␣␣+07␣␣	␣␣␣-06␣␣	␣␣␣+1397024760␣␣	␣␣␣-1555056901␣␣
106/6p.	␣␣␣␣7␣␣␣	␣␣␣-6␣␣␣	␣1397024760␣␣␣	␣-1555056901␣␣␣
107/6p.	␣␣␣␣7␣␣␣	␣␣␣␣-6␣␣␣	␣␣␣␣1397024760␣␣␣	␣␣␣␣-1555056901␣␣␣

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

(A) `printf("␣␣␣␣␣%2d␣␣␣",x);` (D) `printf("␣␣␣␣␣%0+3d␣␣␣",x);` (G) `printf("␣%0+7d␣␣",x);`
(B) `printf("␣␣␣␣␣%␣03d␣␣␣",x);` (E) `printf("␣␣␣␣%␣4d␣␣␣",x);` (H) `printf("␣%9d",x);`
(C) `printf("␣␣␣␣␣%+-3d␣␣␣",x);` (F) `printf("␣%-6d␣␣␣",x);` (I) `printf("%-+10d",x);`

inputs:	9	-1	1676325727	-2111992449
108/6p.	␣+000009␣␣	␣-000001␣␣	␣+1676325727␣␣	␣-2111992449␣␣
109/6p.	␣9␣␣␣␣␣␣␣	␣-1␣␣␣␣␣␣␣	␣1676325727␣␣␣	␣-2111992449␣␣␣
110/6p.	␣␣␣␣␣␣␣␣␣9	␣␣␣␣␣␣␣␣␣-1	␣1676325727	␣-2111992449
111/6p.	␣␣␣␣␣␣9␣␣␣	␣␣␣␣␣␣-1␣␣␣	␣␣␣␣␣1676325727␣␣␣	␣␣␣␣␣␣-2111992449␣␣␣
112/6p.	␣␣␣␣+09␣␣␣	␣␣␣␣␣-01␣␣␣	␣␣␣␣␣+1676325727␣␣␣	␣␣␣␣␣-2111992449␣␣␣

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

inputs:	""	"k"	"wg"	"gkcy"	"ylxlpg"	"lvpdkjgd"
113/6p.	␣␣␣␣	k␣␣␣	wg␣␣	gkcy	ylxlpg	lvpdkjgd
114/6p.	␣␣␣␣	␣␣␣k	␣␣wg	gkcy	ylxlpg	lvpdkjgd
115/6p.	␣␣␣␣	k␣␣␣	wg␣␣	gkcy␣␣	ylxlpg␣␣	lvpdkjgd␣␣
116/6p.	␣␣␣␣	␣␣k␣	␣␣wg␣	␣␣gkcy␣	␣␣ylxlpg␣	␣␣lvpdkjgd␣
117/6p.	␣␣␣␣	␣␣k␣␣	␣␣wg␣␣	␣␣gkcy␣␣	␣␣ylxlpg␣␣	␣␣lvpdkjgd␣␣

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

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

inputs:	""	"f"	"gd"	"xgff"	"dhyfjc"	"jyzlhqhb"
118/6p.	␣␣␣␣	␣␣␣f␣	␣␣␣gd␣	␣␣␣xgff␣	␣␣␣dhyfjc␣	␣␣␣jyzlhqhb␣
119/6p.	␣␣␣␣	f␣␣␣	gd␣␣	xgff␣	dhyfjc␣	jyzlhqhb␣
120/6p.	␣␣␣␣	␣f␣␣	␣gd␣␣	␣xgff␣␣	␣dhyfjc␣␣	␣jyzlhqhb␣␣
121/6p.	␣␣␣␣	␣␣f␣	␣gd␣	␣xgff␣	␣dhyfjc␣	␣jyzlhqhb␣
122/6p.	␣␣␣␣	f␣␣␣	gd␣␣	xgff	dhyfjc	jyzlhqhb

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

(A) `printf("␣␣%+010.6f␣␣",x);` (D) `printf("␣␣%010.6f␣␣",x);` (G) `printf("␣%012.0f␣",x);`
(B) `printf("␣␣%+011.4f␣",x);` (E) `printf("␣%+12.2f␣",x);` (H) `printf("␣%11.2f␣␣",x);`
(C) `printf("␣␣%+10.6f␣␣",x);` (F) `printf("␣%0+13f",x);` (I) `printf("%+14.6f",x);`

inputs:	5	-8.30	1.4324	-15102.226755
123/6p.	␣␣+00005.0000␣	␣␣-00008.3000␣	␣␣+00001.4324␣	␣␣-15102.2268␣
124/6p.	␣␣␣+5.000000␣␣	␣␣␣-8.300000␣␣	␣␣␣+1.432400␣␣	␣␣-15102.226755␣␣
125/6p.	␣␣+05.000000␣␣	␣␣-08.300000␣␣	␣␣+01.432400␣␣	␣␣-15102.226755␣␣
126/6p.	␣␣␣␣␣␣␣␣+5.00␣	␣␣␣␣␣␣␣␣-8.30␣	␣␣␣␣␣␣␣␣+1.43␣	␣␣␣␣-15102.23␣
127/6p.	␣␣␣␣␣␣+5.000000	␣␣␣␣␣␣-8.300000	␣␣␣␣␣␣+1.432400	␣-15102.226755

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

(A) `printf("␣␣␣%010.6f␣",x);` (D) `printf("␣%+12.0f␣",x);` (G) `printf("%+14f",x);`
(B) `printf("␣␣%+12.2f",x);` (E) `printf("␣%0+13.0f",x);` (H) `printf("%0+13.6f␣",x);`
(C) `printf("␣%+011.6f␣␣",x);` (F) `printf("␣%12.4f␣",x);` (I) `printf("%014f",x);`

inputs:	4	-2.59	1.2869	-230783.351061
128/6p.	␣␣␣004.000000␣	␣␣␣-02.590000␣	␣␣␣001.286900␣	␣␣␣-230783.351061␣
129/6p.	␣␣␣␣␣␣␣␣␣+4.00	␣␣␣␣␣␣␣␣␣-2.59	␣␣␣␣␣␣␣␣␣+1.29	␣␣␣␣-230783.35
130/6p.	0000004.000000	-000002.590000	0000001.286900	-230783.351061
131/6p.	␣␣␣␣␣␣␣4.0000␣	␣␣␣␣␣␣-2.5900␣	␣␣␣␣␣␣␣1.2869␣	␣-230783.3511␣
132/6p.	␣+000000000004	␣-000000000003	␣+000000000001	␣-000000230783

Total points 998.

Answer Key (points per line)

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

Total points 998.