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) `dir` (C) `list` (D) `ls` (E) `pass` (F) `passwd` (G) `pwd` (H) `rd` (I) `type`

1/8p. change your password
2/8p. delete a directory
3/8p. show the contents of the directory
4/8p. type out a text file

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

(A) `cwd` (B) `df` (C) `full` (D) `md` (E) `mkdir` (F) `mv` (G) `pwd` (H) `ren` (I) `volume`

5/8p. see how full the disks are
6/8p. tell what directory you are in
7/8p. create a directory
8/8p. rename a file

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

(A) `cap` (B) `df` (C) `du` (D) `emacs` (E) `fg` (F) `gcc` (G) `ls` (H) `passwd` (I) `top`

9/8p. return from shell-out
10/8p. see what is running
11/8p. compile a program
12/8p. edit a file

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

(A) `del` (B) `delete` (C) `du` (D) `exit` (E) `quit` (F) `rm` (G) `space` (H) `w` (I) `who`

13/8p. log out
14/8p. delete a file
15/8p. see who is logged in
16/8p. see how much disk space you are using

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

(A) `C-d` (C) `C-p` (E) `C-x C-i` (G) `ESC-x rmail` (I) `M-x rmail`
(B) `C-delete` (D) `C-u` (F) `C-x i` (H) `M-`

17/5p. insert a file
18/5p. run mail
19/5p. delete current character
20/5p. press ESC first
21/5p. go to previous line (up 1)

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

(A) `C-` (C) `C-e` (E) `C-p` (G) `C-x C-s` (I) `M-`
(B) `C-b` (D) `C-l` (F) `C-s` (H) `C-z`

22/5p. save current buffer, same filename
23/5p. go to end of line
24/5p. shell out
25/5p. go to previous character (left 1)
26/5p. start incremental search

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

(A) `C-c` (C) `C-k` (E) `C-x C-f` (G) `C-x n` (I) `M-x rmail`
(B) `C-h t` (D) `C-s` (F) `C-x C-l` (H) `C-x o`

27/5p. jump to next window
28/5p. load a new file
29/5p. hold down CTRL
30/5p. cut to end of line

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

(A) `C-c` (C) `C-h t` (E) `C-x` (G) `C-x 1` (I) `C-x o`
(B) `C-g` (D) `C-t` (F) `C-x 0` (H) `C-x 2`

31/5p. open a second window
32/5p. show the tutorial
33/5p. close all but current window
34/5p. cancel the command in progress

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

(A) `C-_` (C) `C-r` (E) `C-x 1` (G) `C-x C-q` (I) `C-x o`
(B) `C-l` (D) `C-u` (F) `C-x C-c` (H) `C-x C-w`

35/5p. center and redraw screen
36/5p. save-as current buffer, specify filename
37/5p. undo last change
38/5p. exit/quit

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

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

39/5p. go to next line (down 1)
40/5p. go to start of line
41/5p. paste back what was deleted
42/5p. go to next character (right 1)

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

43/10p.	`3-3-1/3+8`	(A) -8	(B) -5	(C) -1	(D) 0	(E) 3	(F) 8	(G) 11	(H) 21
44/10p.	`4-4>=9&&7-3`	(A) -32	(B) -18	(C) 0	(D) 1	(E) 3	(F) 4	(G) 6	(H) 7
45/10p.	`2+5<=6<=9-3`	(A) -64	(B) -3	(C) -2	(D) -1	(E) 0	(F) 1	(G) 2	(H) 3
46/10p.	`5/5>5||4-7`	(A) -68	(B) -7	(C) -6	(D) -2	(E) -1	(F) 1	(G) 14	(H) 35
47/10p.	`5+5*9/6+6`	(A) 0	(B) 4	(C) 5	(D) 8	(E) 16	(F) 18	(G) 21	(H) 40
48/10p.	`9-7%5-2/9`	(A) -75	(B) -48	(C) -44	(D) -41	(E) 0	(F) 1	(G) 9	(H) 72
49/10p.	`7-2/4/3-7`	(A) -7	(B) -5	(C) -2	(D) 0	(E) 7	(F) 8	(G) 12	(H) 14
50/10p.	`8-9/1%3+1`	(A) -57	(B) -2	(C) -1	(D) 3	(E) 7	(F) 9	(G) 71	(H) 91
51/10p.	`6/2<5>=5-7`	(A) -90	(B) -88	(C) -68	(D) -7	(E) -6	(F) -1	(G) 1	(H) 6
52/10p.	`8-7/2%9+3`	(A) -71	(B) -15	(C) 0	(D) 2	(E) 3	(F) 5	(G) 8	(H) 39
53/10p.	`1-6==6&&6-7`	(A) -7	(B) -6	(C) 0	(D) 7	(E) 8	(F) 79	(G) 83	(H) 86
54/10p.	`8*5>=2||7-9`	(A) -64	(B) -40	(C) -8	(D) -1	(E) 8	(F) 15	(G) 21	(H) 82
55/10p.	`9-5<4==2+4`	(A) -68	(B) 0	(C) 4	(D) 5	(E) 13	(F) 19	(G) 25	(H) 36
56/10p.	`8-8%5-4*8`	(A) -77	(B) -32	(C) -27	(D) 8	(E) 16	(F) 27	(G) 37	(H) 64
57/10p.	`2*5%8+6+4`	(A) -80	(B) -45	(C) 10	(D) 12	(E) 14	(F) 18	(G) 20	(H) 26
58/10p.	`6+5>8>1*2`	(A) 1	(B) 2	(C) 7	(D) 8	(E) 12	(F) 14	(G) 81	(H) 89
59/10p.	`6+8&&8==6-4`	(A) -4	(B) 0	(C) 2	(D) 6	(E) 7	(F) 42	(G) 50	(H) 85
60/10p.	`2%9%5-4-8`	(A) -14	(B) -10	(C) -8	(D) -3	(E) 2	(F) 6	(G) 23	(H) 70
61/10p.	`7%7/1%4-4`	(A) -92	(B) -25	(C) -3	(D) -2	(E) 0	(F) 1	(G) 60	(H) 71
62/10p.	`6+6%9/2*4`	(A) 0	(B) 1	(C) 4	(D) 6	(E) 14	(F) 18	(G) 24	(H) 32
63/10p.	`9%3-7-7/2`	(A) -71	(B) -10	(C) -7	(D) -6	(E) -5	(F) -4	(G) -3	(H) 83
64/10p.	`7+7-3-3*3`	(A) -1	(B) 2	(C) 10	(D) 14	(E) 28	(F) 30	(G) 42	(H) 47
65/10p.	`9-6*4<=2||8`	(A) -19	(B) 0	(C) 1	(D) 3	(E) 8	(F) 9	(G) 11	(H) 18
66/10p.	`7+2==1!=2-3`	(A) -2	(B) 0	(C) 1	(D) 4	(E) 5	(F) 7	(G) 8	(H) 38
67/10p.	`9/2-5!=5==5`	(A) -14	(B) -3	(C) 0	(D) 3	(E) 4	(F) 9	(G) 65	(H) 98

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

68/10p. `int m=10; while( --m > 3 ) body;`

69/10p. `int v=1; do body; while( v++ < 5 );`

70/10p. `int r=3; do body; while( --r >= -4 );`

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

72/10p. `int s=-5; while( ++s != -2 ) body;`

73/10p. `int a=-4; while( ++a > -10 ) body;`

74/10p. `int s=3; do body; while( ++s <= 9 );`

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

76/10p. `int u=-5; do body; while( --u != -12 );`

77/10p. `int k; for( k=3; k<=2; ++k ) body;`

78/10p. `int g=7; while( g-- != 1 ) body;`

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

80/10p. `int d=-4; do body; while( --d != -6 );`

81/10p. `int x=-7; while( x++ != -1 ) body;`

82/10p. `int v; for( v=0; v>-7; v-- ) body;`

83/10p. `int f=-6; do body; while( --f > -10 );`

84/10p. `int d=6; while( d++ != -1 ) body;`

85/10p. `int k=10; while( ++k != 4 ) body;`

86/10p. `int h=0; while( h++ <= 2 ) body;`

87/10p. `int r=0; while( r++ != 6 ) body;`

88/10p. `int x=6; while( x-- > 1 ) body;`

89/10p. `int n; for( n=-10; n<-10; n++ ) body;`

90/10p. `int i=9; while( i++ <= 16 ) body;`

91/10p. `int r=3; do body; while( --r >= -2 );`

92/10p. `int u=1; do body; while( u++ <= 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("␣␣␣␣␣␣%␣d␣␣␣",x);` (D) `printf("␣␣%␣05d␣␣␣",x);` (G) `printf("␣%+06d␣␣␣",x);`
(B) `printf("␣␣␣␣␣%04d␣",x);` (E) `printf("␣␣%-␣5d␣␣␣",x);` (H) `printf("␣%+9d",x);`
(C) `printf("␣␣␣%05d␣␣",x);` (F) `printf("␣␣%-5d␣␣␣",x);` (I) `printf("%+10d",x);`

inputs:	2	-2	1568464460	-1583853360
93/6p.	␣␣␣0002␣␣␣	␣␣-0002␣␣␣	␣␣␣1568464460␣␣␣	␣␣-1583853360␣␣␣
94/6p.	␣␣␣␣␣␣␣␣+2	␣␣␣␣␣␣␣␣-2	+1568464460	-1583853360
95/6p.	␣␣␣␣␣␣␣2␣␣␣	␣␣␣␣␣␣␣-2␣␣␣	␣␣␣␣␣␣␣1568464460␣␣␣	␣␣␣␣␣␣␣-1583853360␣␣␣
96/6p.	␣␣␣␣␣␣␣␣+2	␣␣␣␣␣␣␣␣-2	␣+1568464460	␣-1583853360
97/6p.	␣␣␣2␣␣␣␣␣␣	␣␣-2␣␣␣␣␣␣	␣␣␣1568464460␣␣␣	␣␣-1583853360␣␣␣

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

(A) `printf("␣␣␣%+3d␣",x);` (D) `printf("␣%+4d␣␣",x);` (G) `printf("%␣6d␣",x);`
(B) `printf("␣␣%-3d␣␣",x);` (E) `printf("%␣04d␣␣␣",x);` (H) `printf("%+-6d␣",x);`
(C) `printf("␣␣%0␣3d␣␣",x);` (F) `printf("%␣5d␣␣",x);` (I) `printf("%+5d␣␣",x);`

inputs:	3	-9	1334704747	-1940138254
98/6p.	␣␣␣03␣␣	␣␣-09␣␣	␣␣␣1334704747␣␣	␣␣-1940138254␣␣
99/6p.	␣␣␣␣␣3␣	␣␣␣␣-9␣	␣1334704747␣	-1940138254␣
100/6p.	␣␣␣+3␣␣	␣␣␣-9␣␣	␣+1334704747␣␣	␣-1940138254␣␣
101/6p.	␣␣␣␣3␣␣	␣␣␣-9␣␣	␣1334704747␣␣	-1940138254␣␣
102/6p.	␣␣␣␣+3␣	␣␣␣␣-9␣	␣␣␣+1334704747␣	␣␣␣-1940138254␣

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

(A) `printf("␣␣␣%␣3d␣␣␣",x);` (D) `printf("␣␣%-7d",x);` (G) `printf("␣␣%5d␣␣",x);`
(B) `printf("␣␣␣%-␣6d",x);` (E) `printf("␣␣%0␣5d␣␣",x);` (H) `printf("␣%+-7d␣",x);`
(C) `printf("␣␣␣%3d␣␣␣",x);` (F) `printf("␣␣%0␣7d",x);` (I) `printf("%-+8d␣",x);`

inputs:	7	-5	1850898464	-1718828582
103/6p.	␣␣␣␣7␣␣␣␣	␣␣␣␣-5␣␣␣␣	␣␣␣␣1850898464	␣␣␣-1718828582
104/6p.	␣␣␣␣␣7␣␣␣	␣␣␣␣␣-5␣␣␣	␣␣␣1850898464␣␣␣	␣␣␣-1718828582␣␣␣
105/6p.	+7␣␣␣␣␣␣␣	-5␣␣␣␣␣␣␣	+1850898464␣	-1718828582␣
106/6p.	␣␣7␣␣␣␣␣␣	␣␣-5␣␣␣␣␣	␣␣1850898464	␣␣-1718828582
107/6p.	␣␣␣0007␣␣	␣␣-0005␣␣	␣␣␣1850898464␣␣	␣␣-1718828582␣␣

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("␣␣␣␣%02d␣␣",x);` (E) `printf("␣␣␣%+-4d␣",x);` (H) `printf("%␣3d␣␣␣␣␣",x);`
(C) `printf("␣␣␣%␣4d␣",x);` (F) `printf("␣%+5d␣␣",x);` (I) `printf("%+-8d",x);`

inputs:	7	-3	2070706588	-1524303255
108/6p.	␣␣␣+7␣␣␣	␣␣␣-3␣␣␣	␣␣␣+2070706588␣	␣␣␣-1524303255␣
109/6p.	␣+0007␣␣	␣-0003␣␣	␣+2070706588␣␣	␣-1524303255␣␣
110/6p.	␣␣␣␣07␣␣	␣␣␣␣-3␣␣	␣␣␣␣2070706588␣␣	␣␣␣␣-1524303255␣␣
111/6p.	+7␣␣␣␣␣␣	-3␣␣␣␣␣␣	+2070706588	-1524303255
112/6p.	␣␣␣␣+7␣␣	␣␣␣␣-3␣␣	␣+2070706588␣␣	␣-1524303255␣␣

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

(A) `printf("␣␣␣␣%1s",x);` (D) `printf("␣%1s␣␣␣",x);` (G) `printf("␣%s␣␣␣␣",x);`
(B) `printf("␣␣␣%s␣␣",x);` (E) `printf("␣%3s␣",x);` (H) `printf("%-2s␣␣␣",x);`
(C) `printf("␣␣%-3s",x);` (F) `printf("␣%4s",x);` (I) `printf("%5s",x);`

inputs:	""	"q"	"cf"	"qblw"	"bwjxkc"	"bhlwyzll"
113/6p.	`␣␣␣␣␣`	`␣␣␣␣q`	`␣␣␣cf`	`␣qblw`	`␣bwjxkc`	`␣bhlwyzll`
114/6p.	`␣␣␣␣␣`	`␣␣␣q␣`	`␣␣cf␣`	`␣qblw␣`	`␣bwjxkc␣`	`␣bhlwyzll␣`
115/6p.	`␣␣␣␣␣`	`␣q␣␣␣␣`	`␣cf␣␣␣␣`	`␣qblw␣␣␣␣`	`␣bwjxkc␣␣␣␣`	`␣bhlwyzll␣␣␣␣`
116/6p.	`␣␣␣␣␣`	`␣␣␣␣q`	`␣␣␣␣cf`	`␣␣␣␣qblw`	`␣␣␣␣bwjxkc`	`␣␣␣␣bhlwyzll`
117/6p.	`␣␣␣␣␣`	`␣␣q␣␣`	`␣␣cf␣`	`␣␣qblw`	`␣␣bwjxkc`	`␣␣bhlwyzll`

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

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

inputs:	""	"w"	"bp"	"gvfc"	"kvcklx"	"qlywqchc"
118/6p.	`␣␣␣␣`	`␣␣␣w␣`	`␣␣␣bp␣`	`␣␣␣gvfc␣`	`␣␣␣kvcklx␣`	`␣␣␣qlywqchc␣`
119/6p.	`␣␣␣␣`	`w␣␣␣`	`bp␣␣`	`gvfc`	`kvcklx`	`qlywqchc`
120/6p.	`␣␣␣␣`	`␣␣w␣`	`␣bp␣`	`gvfc␣`	`kvcklx␣`	`qlywqchc␣`
121/6p.	`␣␣␣␣`	`␣␣␣w`	`␣␣bp`	`gvfc`	`kvcklx`	`qlywqchc`
122/6p.	`␣␣␣␣`	`␣w␣␣`	`␣bp␣`	`␣gvfc`	`␣kvcklx`	`␣qlywqchc`

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

(A) `printf("␣␣␣%+10.4f␣",x);` (D) `printf("␣%0+12.4f␣",x);` (G) `printf("%0+12f␣␣",x);`
(B) `printf("␣␣␣%10.2f␣",x);` (E) `printf("␣%11f␣␣",x);` (H) `printf("%011.6f␣␣␣",x);`
(C) `printf("␣␣%+12.6f",x);` (F) `printf("%+14.4f",x);` (I) `printf("%11.2f␣␣␣",x);`

inputs:	3	-3.20	-8.3097	-237601.006329
123/6p.	`␣␣␣␣␣+3.000000`	`␣␣␣␣␣-3.200000`	`␣␣␣␣␣-8.309700`	`␣␣-237601.006329`
124/6p.	`0003.000000␣␣␣`	`-003.200000␣␣␣`	`-008.309700␣␣␣`	`-237601.006329␣␣␣`
125/6p.	`␣␣␣␣␣␣␣␣␣3.00␣`	`␣␣␣␣␣␣␣␣-3.20␣`	`␣␣␣␣␣␣␣␣-8.31␣`	`␣␣␣-237601.01␣`
126/6p.	`␣␣␣␣␣␣␣3.00␣␣␣`	`␣␣␣␣␣␣-3.20␣␣␣`	`␣␣␣␣␣␣-8.31␣␣␣`	`␣-237601.01␣␣␣`
127/6p.	`+0003.000000␣␣`	`-0003.200000␣␣`	`-0008.309700␣␣`	`-237601.006329␣␣`

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

(A) `printf("␣␣␣%+10.4f␣",x);` (D) `printf("␣%+11f␣␣",x);` (G) `printf("%0+14.0f",x);`
(B) `printf("␣␣␣%11f",x);` (E) `printf("␣%0+10.6f␣␣␣",x);` (H) `printf("%014.4f",x);`
(C) `printf("␣␣%010.4f␣␣",x);` (F) `printf("%+13.2f␣",x);` (I) `printf("%11.6f␣␣␣",x);`

inputs:	3	-2.18	-1.1920	-74208.575993
128/6p.	`+0000000000003`	`-0000000000002`	`-0000000000001`	`-0000000074209`
129/6p.	`000000003.0000`	`-00000002.1800`	`-00000001.1920`	`-00074208.5760`
130/6p.	`␣␣␣␣␣␣3.000000`	`␣␣␣␣␣␣-2.180000`	`␣␣␣␣␣␣-1.192000`	`␣␣␣-74208.575993`
131/6p.	`␣␣00003.0000␣␣`	`␣␣-0002.1800␣␣`	`␣␣-0001.1920␣␣`	`␣␣-74208.5760␣␣`
132/6p.	`␣+03.000000␣␣␣`	`␣-02.180000␣␣␣`	`␣-01.192000␣␣␣`	`␣-74208.575993␣␣␣`

Total points 998.

Answer Key (points per line)

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

Total points 998.