

adder.c

1/1

lectures/1/src/

```
1: /*****
2:  * adder.c
3:  *
4:  * Computer Science 50
5:  * David J. Malan
6:  *
7:  * Adds two numbers.
8:  *
9:  * Demonstrates use of CS50's library.
10: *****/
11:
12: #include <cs50.h>
13: #include <stdio.h>
14:
15: int
16: main(void)
17: {
18:     // ask user for input
19:     printf("Give me an integer: ");
20:     int x = GetInt();
21:     printf("Give me another integer: ");
22:     int y = GetInt();
23:
24:     // do the math
25:     printf("The sum of %d and %d is %d!\n", x, y, x + y);
26: }
```

conditions1.c

1/1

lectures/1/src/

```
1: /*****
2:  * conditions1.c
3:  *
4:  * Computer Science 50
5:  * David J. Malan
6:  *
7:  * Tells user if his or her input is positive or negative (somewhat
8:  * innacurately).
9:  *
10: * Demonstrates use of if-else construct.
11: *****/
12:
13: #include <cs50.h>
14: #include <stdio.h>
15:
16: int
17: main(void)
18: {
19:     // ask user for an integer
20:     printf("I'd like an integer please: ");
21:     int n = GetInt();
22:
23:     // analyze user's input (somewhat inaccurately)
24:     if (n > 0)
25:         printf("You picked a positive number!\n");
26:     else
27:         printf("You picked a negative number!\n");
28: }
```

conditions2.c

1/1

lectures/1/src/

```
1: /*****
2:  * conditions2.c
3:  *
4:  * Computer Science 50
5:  * David J. Malan
6:  *
7:  * Tells user if his or her input is positive or negative.
8:  *
9:  * Demonstrates use of if-else if-else construct.
10: *****/
11:
12: #include <cs50.h>
13: #include <stdio.h>
14:
15: int
16: main(void)
17: {
18:     // ask user for an integer
19:     printf("I'd like an integer please: ");
20:     int n = GetInt();
21:
22:     // analyze user's input
23:     if (n > 0)
24:         printf("You picked a positive number!\n");
25:     else if (n == 0)
26:         printf("You picked zero!\n");
27:     else
28:         printf("You picked a negative number!\n");
29: }
```

f2c.c

1/1

lectures/1/src/

```
1: /*****
2:  * f2c.c
3:  *
4:  * Computer Science 50
5:  * David J. Malan
6:  *
7:  * Converts Fahrenheit to Celsius.
8:  *
9:  * Demonstrates arithmetic.
10: *****/
11:
12: #include <cs50.h>
13: #include <stdio.h>
14:
15: int
16: main(void)
17: {
18:     // ask user user for temperature in Fahrenheit
19:     printf("Temperature in F: ");
20:     float f = GetFloat();
21:
22:     // convert F to C
23:     float c = 5 / 9.0 * (f - 32);
24:
25:     // display result
26:     printf("%.1f F = %.1f C\n", f, c);
27: }
```

hai1.c

1/1

lectures/1/src/

```
1: /*****
2:  * hai1.c
3:  *
4:  * Computer Science 50
5:  * David J. Malan
6:  *
7:  * Says hello to the world.
8:  *
9:  * Demonstrates use of printf.
10: *****/
11:
12: #include <stdio.h>
13:
14: int
15: main(void)
16: {
17:     printf("O hai, world!\n");
18: }
```

hai2.c

1/1

lectures/1/src/

```
1: /*****
2:  * hai2.c
3:  *
4:  * Computer Science 50
5:  * David J. Malan
6:  *
7:  * Says hello to just David.
8:  *
9:  * Demonstrates use of CS50's library.
10: *****/
11:
12: #include <cs50.h>
13: #include <stdio.h>
14:
15: int
16: main(void)
17: {
18:     string name = "David";
19:     printf("O hai, %s!\n", name);
20: }
```

hai3.c

1/1

lectures/1/src/

```

1: /*****
2:  * hai3.c
3:  *
4:  * Computer Science 50
5:  * David J. Malan
6:  *
7:  * Says hello to whomever.
8:  *
9:  * Demonstrates use of CS50's library and standard input.
10: *****/
11:
12: #include <cs50.h>
13: #include <stdio.h>
14:
15: int
16: main(void)
17: {
18:     printf("State your name: ");
19:     string name = GetString();
20:     printf("O hai, %s!\n", name);
21: }

```

holloway.c

1/1

lectures/1/src/

```

1: /* http://www.ioccc.org/years.html */
2:
3: #include "stdio.h"
4: #define e 3
5: #define g (e/e)
6: #define h ((g+e)/2)
7: #define f (e-g-h)
8: #define j (e*e-g)
9: #define k (j-h)
10: #define l(x) tab2[x]/h
11: #define m(n,a) ((n&(a))==a)
12:
13: long tab1[]={ 989L,5L,26L,0L,88319L,123L,0L,9367L };
14: int tab2[]={ 4,6,10,14,22,26,34,38,46,58,62,74,82,86 };
15:
16: main(m1,s) char *s; {
17:     int a,b,c,d,o[k],n=(int)s;
18:     if(m1==1){ char b[2*j+f-g]; main(l(h+e)+h+e,b); printf(b); }
19:     else switch(m1-h){
20:         case f:
21:             a=(b=(c=(d=g)<<g)<<g)<<g);
22:             return(m(n,a|c)|m(n,b)|m(n,a|d)|m(n,c|d));
23:         case h:
24:             for(a=f;a<j;++a)if(tab1[a]&&!(tab1[a]%((long)l(n))))return(a);
25:         case g:
26:             if(n<h)return(g);
27:             if(n<j){n-=g;c='D';o[f]=h;o[g]=f;}
28:             else{c='r'-'b';n-=j-g;o[f]=o[g]=g;}
29:             if((b=n)>=e)for(b=g<<g;b<n;++b)o[b]=o[b-h]+o[b-g]+c;
30:             return(o[b-g]*n+k-h);
31:         default:
32:             if(m1==e) main(m1-g+e+h,s+g); else *(s+g)=f;
33:             for(*s=a=f;a<e;) *s=(s<<e)|main(h+a++,(char *)m1);
34:     }
35: }
36:
37:

```

math1.c

1/1

lectures/1/src/

```
1: /*****
2:  * math1.c
3:  *
4:  * Computer Science 50
5:  * David J. Malan
6:  *
7:  * Computes a total but does nothing with it.
8:  *
9:  * Demonstrates use of variables.
10: *****/
11:
12: #include <stdio.h>
13:
14: int
15: main(void)
16: {
17:     int x = 1;
18:     int y = 2;
19:     int z = x + y;
20: }
```

math2.c

1/1

lectures/1/src/

```
1: /*****
2:  * math2.c
3:  *
4:  * Computer Science 50
5:  * David J. Malan
6:  *
7:  * Computes and prints an integral total.
8:  *
9:  * Demonstrates use of a format string.
10: *****/
11:
12: #include <stdio.h>
13:
14: int
15: main(void)
16: {
17:     int x = 1;
18:     int y = 2;
19:     int z = x + y;
20:     printf("%d", z);
21: }
```

math3.c

1/1

lectures/1/src/

```
1: /*****
2:  * math3.c
3:  *
4:  * Computer Science 50
5:  * David J. Malan
6:  *
7:  * Computes and prints a floating-point total.
8:  *
9:  * Demonstrates loss of precision.
10: *****/
11:
12: #include <stdio.h>
13:
14: int
15: main(void)
16: {
17:     float answer = 17 / 13;
18:     printf("%.2f\n", answer);
19: }
```

math4.c

1/1

lectures/1/src/

```
1: /*****
2:  * math4.c
3:  *
4:  * Computer Science 50
5:  * David J. Malan
6:  *
7:  * Computes and prints a floating-point total.
8:  *
9:  * Demonstrates use of floating-point math.
10: *****/
11:
12: #include <stdio.h>
13:
14: int
15: main(void)
16: {
17:     float answer = 17 / 13.0;
18:     printf("%.2f\n", answer);
19: }
```

math5.c

1/1

lectures/1/src/

```
1: /*****
2:  * math5.c
3:  *
4:  * Computer Science 50
5:  * David J. Malan
6:  *
7:  * Computes and prints a floating-point total.
8:  *
9:  * Demonstrates use of casting.
10: *****/
11:
12: #include <stdio.h>
13:
14: int
15: main(void)
16: {
17:     float answer = 17 / (float) 13;
18:     printf("%.2f\n", answer);
19: }
```

nonswitch.c

1/1

lectures/1/src/

```
1: /*****
2:  * nonswitch.c
3:  *
4:  * Computer Science 50
5:  * David J. Malan
6:  *
7:  * Assesses the size of user's input.
8:  *
9:  * Demonstrates use of Boolean ANDing.
10: *****/
11:
12: #include <cs50.h>
13: #include <stdio.h>
14:
15: int
16: main(void)
17: {
18:     // ask user for an integer
19:     printf("Give me an integer between 1 and 10: ");
20:     int n = GetInt();
21:
22:     // judge user's input
23:     if (n >= 1 && n <= 3)
24:         printf("You picked a small number.\n");
25:     else if (n >= 4 && n <= 6)
26:         printf("You picked a medium number.\n");
27:     else if (n >= 7 && n <= 10)
28:         printf("You picked a big number.\n");
29:     else
30:         printf("You picked an invalid number.\n");
31: }
```

```
1: /*****
2:  * positive1.c
3:  *
4:  * Computer Science 50
5:  * David J. Malan
6:  *
7:  * Demands that user provide a positive number.
8:  *
9:  * Demonstrates use of do-while.
10: *****/
11:
12: #include <cs50.h>
13: #include <stdio.h>
14:
15: int
16: main(void)
17: {
18:     // loop until user provides a positive integer
19:     int n;
20:     do
21:     {
22:         printf("I demand that you give me a positive integer: ");
23:         n = GetInt();
24:     }
25:     while (n < 1);
26:     printf("Thanks for the %d!\n", n);
27: }
```

```
1: /*****
2:  * positive2.c
3:  *
4:  * Computer Science 50
5:  * David J. Malan
6:  *
7:  * Demands that user provide a positive number.
8:  *
9:  * Demonstrates use of bool.
10: *****/
11:
12: #include <cs50.h>
13: #include <stdio.h>
14:
15: int
16: main(void)
17: {
18:     // loop until user provides a positive integer
19:     bool thankful = false;
20:     do
21:     {
22:         printf("I demand that you give me a positive integer: ");
23:         if (GetInt() > 0)
24:             thankful = true;
25:     }
26:     while (thankful == false);
27:     printf("Thanks for the positive integer!\n");
28: }
```



```
1: /*****
2:  * positive3.c
3:  *
4:  * Computer Science 50
5:  * David J. Malan
6:  *
7:  * Demands that user provide a positive number.
8:  *
9:  * Demonstrates use of !.
10: *****/
11:
12: #include <cs50.h>
13: #include <stdio.h>
14:
15: int
16: main(void)
17: {
18:     // loop until user provides a positive integer
19:     bool thankful = false;
20:     do
21:     {
22:         printf("I demand that you give me a positive integer: ");
23:         if (GetInt() > 0)
24:             thankful = true;
25:     }
26:     while (!thankful);
27:     printf("Thanks for the positive integer!\n");
28: }
```

```
1: /*****
2:  * progress1.c
3:  *
4:  * Computer Science 50
5:  * David J. Malan
6:  *
7:  * Simulates a progress bar.
8:  *
9:  * Demonstrates sleep.
10: *****/
11:
12: #include <stdio.h>
13: #include <unistd.h>
14:
15: int
16: main(void)
17: {
18:     // simulate progress from 0% to 100%
19:     for (int i = 0; i <= 100; i++)
20:     {
21:         printf("Percent complete: %d%%\n", i);
22:         sleep(1);
23:     }
24:     printf("\n");
25: }
```

progress2.c

1/1

lectures/1/src/

```
1: /*****
2:  * progress2.c
3:  *
4:  * Computer Science 50
5:  * David J. Malan
6:  *
7:  * Simulates a better progress bar.
8:  *
9:  * Demonstrates \r, fflush, and sleep.
10: *****/
11:
12: #include <stdio.h>
13: #include <unistd.h>
14:
15: int
16: main(void)
17: {
18:     // simulate progress from 0% to 100%
19:     for (int i = 0; i <= 100; i++)
20:     {
21:         printf("\rPercent complete: %d%%", i);
22:         fflush(stdout);
23:         sleep(1);
24:     }
25:     printf("\n");
26: }
```

progress3.c

1/1

lectures/1/src/

```
1: /*****
2:  * progress3.c
3:  *
4:  * Computer Science 50
5:  * David J. Malan
6:  *
7:  * Simulates a better progress bar.
8:  *
9:  * Demonstrates a while loop.
10: *****/
11:
12: #include <stdio.h>
13: #include <unistd.h>
14:
15: int
16: main(void)
17: {
18:     int i = 0;
19:
20:     /* simulate progress from 0% to 100% */
21:     while (i <= 100)
22:     {
23:         printf("\rPercent complete: %d%%", i);
24:         fflush(stdout);
25:         sleep(1);
26:         i++;
27:     }
28:     printf("\n");
29: }
```

sizeof.c

1/1

lectures/1/src/

```

1: /*****
2:  * sizeof.c
3:  *
4:  * Computer Science 50
5:  * David J. Malan
6:  *
7:  * Reports the sizes of C's data types.
8:  *
9:  * Demonstrates use of sizeof.
10: *****/
11:
12: #include <stdio.h>
13:
14: int
15: main(void)
16: {
17:     // some sample variables
18:     char c;
19:     double d;
20:     float f;
21:     int i;
22:
23:     // report the sizes of variables' types
24:     printf("char: %d\n", sizeof(c));
25:     printf("double: %d\n", sizeof(d));
26:     printf("float: %d\n", sizeof(f));
27:     printf("int: %d\n", sizeof(i));
28: }
```

switch1.c

1/1

lectures/1/src/

```

1: /*****
2:  * switch1.c
3:  *
4:  * Computer Science 50
5:  * David J. Malan
6:  *
7:  * Assesses the size of user's input.
8:  *
9:  * Demonstrates use of a switch.
10: *****/
11:
12: #include <cs50.h>
13: #include <stdio.h>
14:
15: int
16: main(void)
17: {
18:     // ask user for an integer
19:     printf("Give me an integer between 1 and 10: ");
20:     int n = GetInt();
21:
22:     // judge user's input
23:     switch (n)
24:     {
25:         case 1:
26:         case 2:
27:         case 3:
28:             printf("You picked a small number.\n");
29:             break;
30:
31:         case 4:
32:         case 5:
33:         case 6:
34:             printf("You picked a medium number.\n");
35:             break;
36:
37:         case 7:
38:         case 8:
39:         case 9:
40:         case 10:
41:             printf("You picked a big number.\n");
42:             break;
43:
44:         default:
45:             printf("You picked an invalid number.\n");
46:     }
47: }
```

```

1: /*****
2:  * switch2.c
3:  *
4:  * Computer Science 50
5:  * David J. Malan
6:  *
7:  * Assesses a user's grade.
8:  *
9:  * Demonstrates use of a switch.
10: *****/
11:
12: #include <cs50.h>
13: #include <stdio.h>
14:
15: int
16: main(void)
17: {
18:     // ask user for a char
19:     printf("Pick a letter grade: ");
20:     char c = GetChar();
21:
22:     // judge user's input
23:     switch (c)
24:     {
25:         case 'A':
26:         case 'a':
27:             printf("You picked an excellent grade.\n");
28:             break;
29:
30:         case 'B':
31:         case 'b':
32:             printf("You picked a good grade.\n");
33:             break;
34:
35:         case 'C':
36:         case 'c':
37:             printf("You picked a fair grade.\n");
38:             break;
39:
40:         case 'D':
41:         case 'd':
42:             printf("You picked a poor grade.\n");
43:             break;
44:
45:         case 'E':
46:         case 'e':
47:             printf("You picked a failing grade.\n");
48:             break;
49:
50:         default:
51:             printf("You picked an invalid grade.\n");
52:     }
53: }

```

```

1: /* http://www.ioccc.org/years.html */
2:
3:
4:         int
5:         X=320           ,Y=200,
6:         n=0,m,          x,y,   j=1024;
7:         double          T=44.0   /7,P[
8:         333333          ],C[5]    = { 0,3,
9:         0,0,8}          ,p=1,      B=11.0
10:        /630,           f=0,r      =    3,g
11:        =7,b            =13,*q=P,   D,*J;
12:        unsigned        char
13:        U[66666],*v=U,*h,l[5555]
14:        ,c=0,*e,*a,*z;
15:
16:        #include <math.h>
17:        #define Rl(t)    t=(int)(t\
18:        *123456789       )%j; t/=j;
19:        #define          Rl(C,t)\
20:        n++[C]           =    t*n/12;
21:        #define          RI(C)    B=-B; Rl\
22:        (r)Rl(g           )Rl(b    )for(n\
23:        =0; n<j; ){ Rl(C    ,r)Rl\
24:        (C,g)Rl(C         ,b)+n; }
25:
26:
27:        #ifdef __DJGPP__
28:        #include <sys/movedata.h>
29:        #include <dpapi.h>
30:        #include <pc.h>
31:        #define          Q(u,v)    u##portb(0x3##v
32:        #define          W          ; Q(out,C9),*h++/4)
33:        void            F(int i){ __dpmi_regs r
34:        ; if(i){ for(; i>=0; i-=8)while(
35:        ~Q(in,DA)
36:        )&8^i); for(m=0,z
37:        =h+j; h    <z; m    ++){ Q(
38:        out,C8),m    )W W W; ++h; } dosmemput
39:        (v,X*Y,0xA0000 ); } else{ r.x.ax=
40:        0x13; __dpmi_int( 0x10,&r); } }
41:        #elif defined(SDL)
42:        #include "SDL/SDL.h"
43:        SDL_Surface     *s; void
44:        F(int i){ if    (i){ SDL_SetColors(
45:        s,h,0,256); SDL_UpdateRect
46:        (s,0,0,0, 0); } else { SDL_Init(
47:        SDL_INIT_VIDEO); s=SDL_SetVideoMode
48:        (X,Y,8,0); v=s->pixels; } }
49:        #else
50:        #include "curses.h"
51:        void F(i){ if(i){ for(y=0;
52:        y<X*Y          ; y++)
53:        { move    (y/X,y%X); addch
54:        ((*v    +y)/ 32)  ["-
55:        ",:+"    "=@" ]); } ; refresh
56:        (); } else{ initscr
57:        (); x= COLS&~1,X=x<X?x:X,y=
58:        LINES  &~1,Y=y<Y?y:Y; } }
59:        #endif
60:
61: main(void)
62: {
63:     F(0);
64: }

```

```
65:     for (x=-X/2,y=-Y/2;y<Y/2;++x>=X/2?x=-X/2,y++:4)
66:         { *q++ = sqrt(x*x+y*y);
67:
68:         *q++ = atan2(x,y);
69:
70:     }for (;n<j*2;l[n++]=0);
71:     for(;;)
72:     {
73:         a=l;z=l+j;e=l+j*2;
74:         if ((p+=B)>1){p=2-p;RI(l+j)}
75:         else if (p<0){p=-p;RI(l)}
76:
77:         while(a<l+j) D=p**a+++(1-p)**z++,*e++=D;
78:         h=l+j*2;
79:
80:         for (J=P,z=v; z<v+X*Y;){
81:             D = *J++;
82:             *z++=fabs(sin(( *J++C[l])*1.5+D*C[0]+C[2]*sin(C[3]+D/C[4]))*255)
;
83:             }F(8);
84:
85:             C[2]+=B; f+=T/360; C[3]+=f;
86:
87:             if (f>T)
88:                 {C[l] += (f-T)/8;
89:
90:                 if (f>T*2)
91:                     C[0]=sin(f)+sin(f*2)/2;
92:                 }
93:             }
94: }
```