Solutions to Chapter 5

Review Questions

1. a. True

3. a. True

5. a. True

7. c. =

9. e. The selection expression cannot have a side effect.

11. b. *else if* and *switch*

13. c. The *else if* requires integral values in its expression.

Exercises

15.

a.

```
(! ((3 + 3) >= 6))
(! (6 >= 6))
(! (true))
false
```

b.

```
(((1 + 6) == 7) || ((3 + 2) == 1))
((7 == 7)       || (5 == 1))
// Second expression not evaluated in following
((true)         || (5 == 1))
true
```

c.

```
(((1 > 5) || (6 < 50)) && (2 < 5))
(((false) || (true))   && (true))
((true)                && (true))
true
```

d.

```
(((14 != 55) && (! (13 < 29))) || (31 > 52))
(((true)     && (! (true)))    || (false))
(( true      && false)         || false)
(( false)                      || (false))
false
```

e.

```
((6 < 7) > 5)
((true)  > 5)
( 1      > 5)
false
```

17.

a. true
b. true
c. true
d. true
e. true

19.

a. false
b. true
c. true
d. true
e. false

21. `x = 4  y = 1  z = 2`
23. `x = 4  y = 1  z = 2`
25. `x = 2  y = 0  z = 2`
27. `x = 0  y = 0  z = 1`
29. `x = 0  y = 1  z = 0`
31. `x = 1  y = 3  z = 1`

33.

a. c (lowercase 'c')
b. ?
c. c (lowercase 'c')
d. 5

Problems

35.

```
if (score >= 90)
    best = 1;
```

37.

```
if (amount > 5.4)
    num += 4;
```

39.

```
if (num)
    printf ("not zero");
else
    printf ("zero");
```

41.

```
if (flag)
   {
    scanf ("%d %d", &a, &b);
    printf ("The sum is:  %d\n", a + b);
    printf ("The average is:  %f\n", (a + b) / 2.0);
   } // if
```

43.

```
switch (ch)
   {
    case 'E' :
    case 'e' :  countE++;
                break;
    case 'A' :
    case 'a' :  countA++;
                break;
    case 'I' :
    case 'i' :  countI++;
                break;
    default  :  printf("Error-Not A, E, or I\a\n");
                break;
   } // switch
```

45.

```
switch (num1)
   {
    case 10 :  num1 *= num1;
               break;
    case 9  :  scanf ("%d", &num1);
               break;
    case 2  :
    case 3  :  printf ("%d", num1 * 99);
               break;
   } // switch
```

47. See Program 5-1.

Program 5-1 Solution to Problem 47

```
/* ==================== smallest ======================
   This function returns the smallest of 3 integers.
      Pre   given 3 integers
      Post  the smallest integer returned
*/

int smallest (int a, int b, int c)
{
// Local Declarations
   int smallest;

// Statements
   if (a < b  &&  a < c)
       smallest = a;
   else if (b < c)
       smallest = b;
   else
```

Program 5-1 Solution to Problem 47 (continued)

```
        smallest = c;
   return smallest;
}  // end of smallest
```

49. See Program 5-2.

Program 5-2 Solution to Problem 49

```
/* ================ month_of_year ===================
   This function displays the month corresponding
   to a number between 1 and 12.
      Pre   given an integer month
      Post  month printed
*/
void month_of_year (int month)
{
// Statements
   switch (month)
          {
           case  1 : printf ("\nJanuary\n");
                     break;
           case  2 : printf ("\nFebruary\n");
                     break;
           case  3 : printf ("\nMarch\n");
                     break;
           case  4 : printf ("\nApril\n");
                     break;
           case  5 : printf ("\nMay\n");
                     break;
           case  6 : printf ("\nJune\n");
                     break;
           case  7 : printf ("\nJuly\n");
                     break;
           case  8 : printf ("\nAugust\n");
                     break;
           case  9 : printf ("\nSeptember\n");
                     break;
           case 10:  printf ("\nOctober\n");
                     break;
           case 11:  printf ("\nNovember\n");
                     break;
           case 12:  printf ("\nDecember\n");
                     break;
           default:  printf ("\nMonth is not valid!\n");
          }// switch
   return;
}  // end of monthOfYear
```

51. See Program 5-3.

Program 5-3 Solution to Problem 51

```
/* ================== smallestOf4 ===================
   This function returns the smallest of 4 integers.
      Pre   given 3 integers
      Post  the smallest integer returned
*/
int smallestOf4 (int a, int b, int c, int d)
{
// Local Declaration
   int smallest;

// Statements
   if (a < b  &&  a < c  &&  a < d)
```

Program 5-3 Solution to Problem 51 (continued)

```
        smallest = a;
    else if (b < c  &&  b < d)
        smallest = b;
    else if (c < d)
        smallest = c;
    else
        smallest = d;
    return smallest;
}  // smallestOf4
```