```
1  // Buggy example for printf
2
3  #include <stdio.h>
4
5  int main(void)
6  {
7   for (int i = 0; i <= 10; i++)
8   {
9     printf("#\n");
10  }
11 }</pre>
```

```
// Buggy example for debug50
 1
 3
    #include <cs50.h>
     #include <stdio.h>
 5
6
7
     int get_negative_int(void);
8
     int main(void)
10
         int i = get_negative_int();
         printf("%i\n", i);
11
     }
12
13
14
    // Prompt user for positive integer
    int get_negative_int(void)
15
16
     {
17
         int n;
18
         do
19
         {
20
             n = get_int("Negative Integer: ");
21
22
         while (n < 0);
23
         return n;
24
    }
```

```
// Averages three (hardcoded) numbers
 1
2
3
4
5
6
7
     #include <stdio.h>
     int main(void)
         // Scores
 8
         int score1 = 72;
         int score2 = 73;
 9
         int score3 = 33;
10
11
         // Print average
12
13
         printf("Average: %f\n", (score1 + score2 + score3) / 3.0);
14
    }
```

```
// Averages three (hardcoded) numbers using an array
 1
 3
4
    #include <cs50.h>
     #include <stdio.h>
 5
 6
7
     int main(void)
 8
         // Scores
 9
         int scores[3];
         scores[0] = 72;
10
         scores[1] = 73;
11
         scores[2] = 33;
12
13
14
         // Print average
15
         printf("Average: f^n, (scores[0] + scores[1] + scores[2]) / 3.0);
16
    }
```

```
// Averages three numbers using an array
 2
 3
     #include <cs50.h>
 4
      #include <stdio.h>
 5
 6
7
      int main(void)
 8
          // Get scores
 9
           int scores[3];
          scores[0] = get_int("Score: ");
scores[1] = get_int("Score: ");
scores[2] = get_int("Score: ");
10
11
12
13
14
          // Print average
15
           printf("Average: f^n, (scores[0] + scores[1] + scores[2]) / 3.0);
16
     }
```

```
// Averages three numbers using an array and a loop
 2
 3
    #include <cs50.h>
    #include <stdio.h>
 5
 6
7
     int main(void)
 8
         // Get scores
 9
         int scores[3];
         for (int i = 0; i < 3; i++)
10
11
         {
12
             scores[i] = get_int("Score: ");
13
14
         // Print average
15
         printf("Average: %f\n", (scores[0] + scores[1] + scores[2]) / 3.0);
16
17
```

```
// Averages three numbers using an array, a constant, and a helper function
 2
 3
    #include <cs50.h>
     #include <stdio.h>
 5
 6
     // Constant
 7
     const int N = 3;
 8
9
     // Prototype
     float average(int length, int array[]);
10
11
12
     int main(void)
13
14
         // Get scores
         int scores[N];
15
         for (int i = 0; i < N; i++)
16
17
             scores[i] = get_int("Score: ");
18
19
         }
20
21
         // Print average
22
         printf("Average: %f\n", average(N, scores));
23
    }
24
25
     float average(int length, int array[])
26
     {
27
         // Calculate average
28
         int sum = 0;
29
         for (int i = 0; i < length; i++)
30
31
             sum += array[i];
32
33
         return sum / (float) length;
34
    }
```

```
1  // Prints char
2
3  #include <stdio.h>
4
5  int main(void)
6  {
7     char c = '#';
8
9     printf("%c\n", c);
10 }
```

```
1  // Prints char's ASCII code
2
3  #include <stdio.h>
4
5  int main(void)
6  {
7     char c = '#';
8
9     printf("%i\n", c);
10 }
```

```
1  // Prints chars
2
3  #include <stdio.h>
4
5  int main(void)
6  {
7     char c1 = 'H';
8     char c2 = 'I';
9     char c3 = '!';
10
11     printf("%c%c%c\n", c1, c2, c3);
12 }
```

```
1  // Prints chars' ASCII codes
2
3  #include <stdio.h>
4
5  int main(void)
6  {
7     char c1 = 'H';
8     char c2 = 'I';
9     char c3 = '!';
10
11     printf("%i %i %i\n", c1, c2, c3);
12 }
```

```
1  // Prints string
2
3  #include <stdio.h>
4
5  int main(void)
6  {
7     string s = "HI!";
8     printf("%s\n", s);
9 }
```

```
1  // Prints string's ASCII codes
2
3  #include <cs50.h>
4  #include <stdio.h>
5
6  int main(void)
7  {
8    string s = "HI!";
9    printf("%i %i %i\n", s[0], s[1], s[2]);
10 }
```

```
1  // Prints string's ASCII codes, including NUL
2
3  #include <cs50.h>
4  #include <stdio.h>
5
6  int main(void)
7  {
8    string s = "HI!";
9    printf("%i %i %i %i\n", s[0], s[1], s[2], s[3]);
10 }
```

```
// Prints string char by char
 1
 3
4
    #include <cs50.h>
    #include <stdio.h>
 5
6
7
    int main(void)
 8
         string s = get_string("Input: ");
 9
         printf("Output: ");
10
         for (int i = 0; s[i] != '\0'; i++)
11
12
             printf("%c", s[i]);
13
14
         printf("\n");
15
    }
```

```
// Prints string char by char, using strlen
 1
 3
      #include <cs50.h>
      #include <stdio.h>
 5
      #include <string.h>
 6
7
8
      int main(void)
           string s = get_string("Input: ");
printf("Output: ");
for (int i = 0; i < strlen(s); i++)</pre>
 9
10
11
12
           {
13
                printf("%c", s[i]);
14
15
           printf("\n");
16
      }
```

```
// Prints string char by char, using strlen, remembering string's length
 2
 3
    #include <cs50.h>
     #include <stdio.h>
 5
     #include <string.h>
 6
7
     int main(void)
 8
 9
         string s = get_string("Input: ");
         printf("Output: ");
10
         for (int i = 0, n = strlen(s); i < n; i++)</pre>
11
12
         {
13
             printf("%c", s[i]);
14
15
         printf("\n");
16
    }
```

```
// Determines the length of a string
 1
 3
4
    #include <cs50.h>
     #include <stdio.h>
 5
 6
     int main(void)
 8
         // Prompt for user's name
 9
         string s = get_string("Name: ");
10
         // Count number of characters up until '\0' (aka NUL)
11
12
         int n = 0;
13
         while (s[n] != '\0')
14
15
             n++;
16
17
         printf("%i\n", n);
18
     }
```

```
// Explicitly casts chars to ints
 1
 3
    #include <cs50.h>
    #include <stdio.h>
 5
     #include <string.h>
 6
7
8
     int main(void)
9
         string s = get_string("String: ");
         for (int i = 0; i < strlen(s); i++)
10
11
12
             int c = (int) s[i];
13
             printf("%c %i\n", s[i], c);
14
        }
15
     }
```

```
// Implicitly casts chars to ints
 1
 3
      #include <cs50.h>
      #include <stdio.h>
 5
6
7
8
9
      #include <string.h>
      int main(void)
           string s = get_string("String: ");
for (int i = 0; i < strlen(s); i++)</pre>
10
11
12
                printf("%c %i\n", s[i], s[i]);
13
14
      }
```

```
// Uppercases a string
2
 3
    #include <cs50.h>
    #include <stdio.h>
 5
    #include <string.h>
 6
7
    int main(void)
8
9
         string s = get string("Before: ");
         printf("After: ");
10
         for (int i = 0, n = strlen(s); i < n; i++)
11
12
         {
13
             if (s[i] >= 'a' \&\& s[i] <= 'z')
14
                 printf("%c", s[i] - 32);
15
16
17
             else
18
19
                 printf("%c", s[i]);
20
21
22
         printf("\n");
23
    }
```

```
// Uppercases string using ctype library (and an unnecessary condition)
2
 3
    #include <cs50.h>
    #include <ctype.h>
 5
    #include <stdio.h>
 6
    #include <string.h>
7
 8
     int main(void)
9
10
         string s = get string("Before: ");
         printf("After: ");
11
         for (int i = 0, n = strlen(s); i < n; i++)</pre>
12
13
14
             if (islower(s[i]))
15
16
                 printf("%c", toupper(s[i]));
17
             else
18
19
20
                 printf("%c", s[i]);
21
22
23
         printf("\n");
24
    }
```

```
// Uppercases string using ctype library
 1
 3
    #include <cs50.h>
    #include <ctype.h>
 5
    #include <stdio.h>
 6
    #include <string.h>
 7
8
     int main(void)
10
         string s = get_string("Before: ");
         printf("After: ");
11
         for (int i = 0, n = strlen(s); i < n; i++)</pre>
12
13
14
             printf("%c", toupper(s[i]));
15
16
         printf("\n");
17
    }
```

```
// Prints a command-line argument
 1
2
3
4
     #include <cs50.h>
     #include <stdio.h>
 5
6
7
     int main(int argc, string argv[])
 8
         if (argc == 2)
 9
10
             printf("hello, %s\n", argv[1]);
11
12
         else
13
14
             printf("hello, world\n");
15
16
     }
```

```
1  // Prints command-line arguments
2
3  #include <cs50.h>
4  #include <stdio.h>
5
6  int main(int argc, string argv[])
7  {
8     for (int i = 0; i < argc; i++)
9     {
10        printf("%s\n", argv[i]);
11     }
12 }</pre>
```

```
// Prints characters in an array of strings
 2
 3
     #include <cs50.h>
     #include <stdio.h>
 5
     #include <string.h>
 6
7
     int main(int argc, string argv[])
 8
     {
 9
         for (int i = 0; i < argc; i++)</pre>
10
             for (int j = 0, n = strlen(argv[i]); j < n; j++)
11
12
13
                 printf("%c\n", argv[i][j]);
14
15
             printf("\n");
16
         }
17
     }
```

```
// Returns explicit value from main
 1
 3
4
    #include <cs50.h>
    #include <stdio.h>
 5
 6
     int main(int argc, string argv[])
 8
         if (argc != 2)
 9
10
             printf("missing command-line argument\n");
11
             return 1;
12
13
         printf("hello, %s\n", argv[1]);
14
         return 0;
15
    }
```