SOLUTIONS

This document contains the solutions to selected Try It Out exercises and the end-of-chapter problems.

Chapter 1

Try It Out 1-1: If you remove the **wait** block, the script will run too fast for you to see the changing color of the cat. You'll see only the last color.

Try It Out 1-2: The *x*-coordinate and the *y*-coordinate will continue to change with the mouse, but the limits are clipped to the range [–240, 240] for the *x*-coordinate and [–180, 180] for the *y*-coordinate.

Problem 1-1: The outputs are: 1, 121, 12321, 1234321, and 123454321. See the file *Prob_01_01.sb2*.

Problem 1-2: The pattern can be made clearer by aligning the results as shown below:

```
    9 * 9    =    81
   99 * 99   =  9801
  999 * 999  =  998001
 9999 * 9999 = 99980001
```

Count the number of nines to the left of the eight and the number of zeros to its right. See the file *Prob_01_02.sb2*.

Problem 1-3: (a) 13; (b) 2; (c) 19; (d) 20; (e) 11; (f) 9; (g) 37; (h) 2; (i) 3; (j) 4.

Problem 1-4: (a) 12; (b) 20; (c) 4; (d) 2; (e) 2. See the file *Prob_01_04.sb2*.

Problem 1-5: (a) 1.41; (b) 0.5; (c) 0.5; (d) 99. See the file *Prob_01_05.sb2*.

Problem 1-6: The average is: (90 + 95 + 98) / 3 = 94.33. See the file *Prob_01_06.sb2*.

Problem 1-7: See the file *Prob_01_07.sb2*.

Problem 1-8: See the file *Prob_01_08.sb2*.

Problem 1-9: See the file *Prob_01_09.sb2*.

Problem 1-10: See the file *Prob_01_10.sb2*.

Problem 1-11: See the file *Prob_01_11.sb2*.

Chapter 2

Try It Out 2-1: The sprite will move to point (50,100), then (150,100), then (150,150), and end up at point (200,150). See the file *TryItOut_02_01.sb2*.

Try It Out 2-2: The sprite will end up at point (70.7, 70.7) pointing up. See the file *TryItOut_02_02.sb2*.

Try It Out 2-3: See the file *TryItOut_02_03.sb2*.

Try It Out 2-4: See the file *TryItOut_02_04.sb2*.

Try It Out 2-5: See the file *TryItOut_02_05.sb2*.

Try It Out 2-6: See the file *TryItOut_02_06.sb2*.

Try It Out 2-7: See the file *TryItOut_02_07.sb2*.

Problem 2-1: See the file *Prob_02_01.sb2*.

Problem 2-2: See the file *Prob_02_02.sb2*.

Problem 2-3: See the file *Prob_02_03.sb2*.

Problem 2-4: See the file *Prob_02_04.sb2*.

Problem 2-5: See the file *Prob_02_05.sb2*.

Problem 2-6: See the file *Prob_02_06.sb2*.

Problem 2-7: See the file *Prob_02_07.sb2*.

Problem 2-8: See the file *Prob_02_08.sb2*.

Problem 2-9: See the file *Prob_02_09.sb2*.

Chapter 3

Try It Out 3-1: See the file *TryItOut_03_01.sb2*.

Try It Out 3-3: See the file *TryItOut_03_03.sb2*.

Try It Out 3-5: Answers will vary.

Problem 3-1: See the file *Prob_03_01.sb2*.

Problem 3-2: See the file *Prob_03_02.sb2*.

Problem 3-3: See the file *Prob_03_03.sb2*.

Problem 3-4: See the file *Prob_03_04.sb2*.

Problem 3-5: See the file *Prob_03_05.sb2*.

Problem 3-6: See the file *Prob_03_06.sb2*.

Problem 3-7: See the file *Prob_03_07.sb2*.

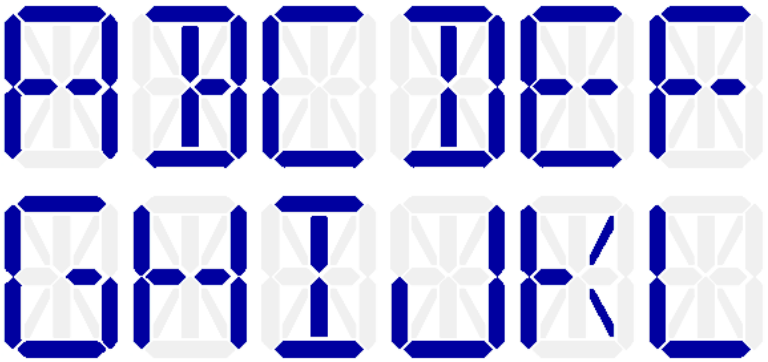
Chapter 4

Try It Out 4-1: See the file *TryItOut_04_01.sb2*.

Try It Out 4-2: The script will no longer work. The problem is with the **change y by −20** block. To make the script work regardless of the sprite's initial orientation, you need to replace this block with the following three blocks: **turn clockwise 90**, **move 20**, **turn counterclockwise 90**. See the file *TryItOut_04_02.sb2* for the complete solution.

Try It Out 4-3: See the file *TryItOut_04_03.sb2*.

Problem 4-1: Solutions will vary. One suggestion is to use a 14-segment display (see the illustration on the next page). You can draw an English letter by using only the segments that make up that letter and skipping the rest.



Problem 4-2: See the file *Prob_04_02.sb2*.

Problem 4-3: See the file *Prob_04_03.sb2*.

Problem 4-4: See the file *Prob_04_04.sb2*.

Problem 4-5: Solutions may vary. See the file *Prob_04_05.sb2* for a sample implementation.

Problem 4-6: See the file *Prob_04_06.sb2*.

Chapter 5

Try It Out 5-1: Since the new variable, sum, has its scope set to For this sprite only, it won't show up in the *Data* palette for the Die1 and Die2 sprites. See the file *TryItOut_05-01.sb2*.

Try It Out 5-2: See the file *TryItOut_05-02.sb2*.

Try It Out 5-3: If you add **change color effect by 25** at the end of the script for the Light sprite, the light bulb will change its color as the light bulb is glowing. See the file *TryItOut_05-03.sb2*.

Try It Out 5-4: The battery voltage equals (V1 + V2 + V3). See the file *TyrItOut_05_04.sb2* for a series circuit with a switch.

Try It Out 5-5: See the file *TryItOut_05-05.sb2*.

Try It Out 5-6: See the file *TryItOut_05-06.sb2*.

Try It Out 5-7: Answers will vary.

Problem 5-1: See the file *Prob_05-01.sb2*.

Problem 5-2: (a) 7; (b) 80; (c) 2.

At the end of iteration	Y	X
1	1	0 + (1 / 1) = 1
2	2	1 + (1 / 2) = 1.5
3	3	1.5 + (1 / 3) = 11 / 6 = 1.833

Problem 5-3: See the file *Prob_05-03.sb2*.

Problem 5-4: See the file *Prob_05-04.sb2*.

Problem 5-5: See the file *Prob_05-05.sb2*.

Problem 5-6: See the file *Prob_05-06.sb2*.

Problem 5-7: See the file *Prob_05-07.sb2*.

Problem 5-8: See the file *Prob_05-08.sb2*.

Problem 5-9: See the file *Prob_05-09.sb2*.

Problem 5-10: See the file *Prob_05-10.sb2*.

Problem 5-11: See the file *Prob_05-11.sb2*.

Chapter 6

Try It Out 6-1: Answers will vary.

Try It Out 6-2: Answers will vary.

Try It Out 6-3: See the file *TryItOut_06-03.sb2*.

Try It Out 6-4: Answers will vary.

Problem 6-1: (a) true; (b) true; (c) true; (d) true; (e) false. See the file *Prob_06-01.sb2*.

Problem 6-2: See the file *Prob_06-02.sb2*.

Problem 6-3: See the file *Prob_06-03.sb2*.

Problem 6-4: See the file *Prob_06-04.sb2*.

Problem 6-5: (a) Pink; (b) Red; (c) Blue, (d) Green. See the file *Prob_06-05.sb2*.

Problem 6-6: See the file *Prob_06-06.sb2*.

Problem 6-7: See the file *Prob_06-07.sb2*.

Problem 6-8: See the file *Prob_06-08.sb2*.

Problem 6-9: See the file *Prob_06-09.sb2*.

Problem 6-10: See the file *Prob_06-10.sb2*.

Chapter 7

Try It Out 7-1: Change the condition of the **repeat until** block as shown on the next page. See the file *TryItOut_07-01.sb2* for a complete implementation of this change.

Try It Out 7-2: The scripts in Figure 7-5 are more responsive to keyboard strokes, and the scripts of Figure 7-6 don't let you move the sprite diagonally by pressing two keys simultaneously. If you place the four **if** blocks in Figure 7-5 together in a single **forever** loop and press two arrow keys at the same time, the sprite will move diagonally. See the files *TryItOut_07-02a.sb2* and *TryItOut_07-02b.sb2*.

Try It Out 7-4: String comparison in Scratch is case insensitive. Therefore, paSS123 will also be considered a valid password. See the file *TryItOut_07-04b.sb2* to see how to implement the **GetPassword** procedure using a **repeat until** block.

Try It Out 7-5: Let the inner loop start from `n1` instead of 1.

Try It Out 7-6: This procedure says the specified word a specific number of times. See the file *TryItOut_07-06.sb2*.

Try It Out 7-7: See the file *TryItOut_07-07.sb2*.

Try It Out 7-8: Answers will vary.

Try It Out 7-9: Answers will vary.

Try It Out 7-10: Answers will vary.

Problem 7-1: See the file *Prob_07-01.sb2*.

Problem 7-2: See the file *Prob_07-02.sb2*.

Problem 7-3: See the file *Prob_07-03.sb2*.

Problem 7-4: See the file *Prob_07-04.sb2*.

Problem 7-5: See the file *Prob_07-05.sb2*.

Problem 7-6: The script finds the sum of the squares of the numbers between 1 and 10. That is, it finds the sum: 12 + 22 + 32 + … + 102. See the file *Prob_07-06.sb2*.

Problem 7-7: (a) 1, 5, 25; (b) 1, 2, 3, 4, 6, 9, 12, 18, 27, 36, 54, 81, 108, 162; (c) 1. See the file *Prob_07-07.sb2*.

Problem 7-8: (a) 127 is prime; (b) 327 is not prime; (c) 523 is prime. See the file *Prob_07-08.sb2*.

Problem 7-9: See the file *Prob_07-09.sb2*.

Problem 7-10: See the file *Prob_07-10.sb2*.

Problem 7-11: See the file *Prob_07-11.sb2*.

Chapter 8

Try It Out 8-1: Use **floor(length/2)** instead of **length/2** in the **repeat** block. That way, even and odd values of length result in the same number of repeats. For example, if length is six, **floor(6/2)** returns 3; if length is seven, **floor(7/2)** also returns 3, eliminating the extra pass of the **repeat** loop.

Try It Out 8-2: See the file *TryItOut_08_02.sb2*.

Try It Out 8-3: See the file *TryItOut_08_03.sb2*.

Try It Out 8-4: See the file *TryItOut_08_04.sb2*.

Try It Out 8-5: (a) $(1010100)_b = 84$; (b) $(1101001)_b = 105$; (c) $(1100001)_b = 97$.

Try It Out 8-6: See the file *TryItOut_08_06.sb2*.

Try It Out 8-7: See the file *TryItOut_08_07.sb2*.

Try It Out 8-8: Answers may vary.

Problem 8-1: See the file *Prob_08-01.sb2*.

Problem 8-2: See the file *Prob_08-02.sb2*.

Problem 8-3: See the file *Prob_08-03.sb2*.

Problem 8-4: See the file *Prob_08-04.sb2*.

Problem 8-5: See the file *Prob_08-05.sb2*.

Problem 8-6: See the file *Prob_08-06.sb2*.

Problem 8-7: See the file *Prob_08-07.sb2*.

Problem 8-8: See the file *Prob_08-08.sb2*.

Problem 8-9: See the file *Prob_08-09.sb2*.

Chapter 9

Try It Out 9-1: Follow the described procedure to populate dayList with the names of the weekdays.

Try It Out 9-2: See the file *TryItOut_09_02.sb2*.

Try It Out 9-3: See the file *TryItOut_09_03.sb2*.

Try It Out 9-4: See the file *TryItOut_09_04.sb2*.

Try It Out 9-5: See the file *TryItOut_09_05.sb2*.

Try It Out 9-6: See the file *TryItOut_09_06.sb2*.

Try It Out 9-7: See the file *TryItOut_09_07.sb2* for sorting a list of names. To make the procedure sort in ascending order, you need to change the less than (<) in Step 5 to greater than (>).

Try It Out 9-8: See the file *TryItOut_09_08.sb2*.

Try It Out 9-9: Answers may vary. See the file *TryItOut_09_09.sb2* for one way to show the user's score on the Stage.

Try It Out 9-10: See the file *TryItOut_09_10.sb2*.

Try It Out 9-11: See the file *TryItOut_09_11.sb2*.

Problem 9-1: See the file *Prob_09-01.sb2*.

Problem 9-2: See the file *Prob_09-02.sb2*.

Problem 9-3: See the file *Prob_09-03.sb2*.

Problem 9-4: The list will contain the following five elements: 5, 4, 11, 10, and 17. See the file *Prob_09-04.sb2*.

Problem 9-5: See the file *Prob_09-05.sb2*.

Problem 9-6: See the file *Prob_09-06.sb2*.

Problem 9-7: See the file *Prob_09-07.sb2*.

Problem 9-8: See the file *Prob_09-08.sb2*.

Problem 9-9: See the file *Prob_09-09.sb2*.