ICS3U Programming Resources

Luke Sawczak *based on* Dr. Daniel Zingaro’s [Learn to Code by Solving Problems](https://www.penguinrandomhouse.com/books/670339/learn-to-code-by-solving-problems-by-daniel-zingaro/)

## Google Colab Notebooks[[1]](#footnote-0)

1. [Programming Notebook](https://colab.research.google.com/drive/1kpWTAhSdf3KORihDwnAOHmObhge6O_ZX?usp=sharing) (glossary + toolbox)
2. [Math](https://colab.research.google.com/drive/1nHkndxY0YD1qaoZxPrSiMmRQfXJn-RUG?usp=sharing)
3. [Strings](https://colab.research.google.com/drive/12fD__BDHaAmA-sDM2hYyV2XVnUVM_JXh?usp=sharing)
4. [Variables & IO](https://colab.research.google.com/drive/1KbwpgrqKX_1v3QnOAQJ-fk9wfNaiQ8Dl?usp=sharing) (input/output)
5. [Conditions](https://colab.research.google.com/drive/1s8vxNwdh2P4a7FvVTGh7ItVymQBvJ75b?usp=sharing) (if/elif/else)
6. [Containers](https://colab.research.google.com/drive/1M6U8eoDcd0-l5YAGDu9kQjyfzf4z-1Mr?usp=sharing)
7. [For loops](https://colab.research.google.com/drive/1NIaW_ACoNZqbzZXKGvm2fz-E9_Zv1cnr?usp=sharing)
8. [While loops](https://colab.research.google.com/drive/1Y_necZfuAJOFGfhv6Otis9F5ue-FuCAQ?usp=sharing)
9. [Loops appendix](https://colab.research.google.com/drive/1nN2QE-aZYd4fs2zz8n9yxtsNlXa10yRK?usp=sharing)
10. [Lists 1 (Introduction)](https://colab.research.google.com/drive/1RriNtEvdvHNyh1Wi7dLW2lm6Rn07FdZy?usp=sharing)
11. [Lists 2 (Lists & Loops)](https://colab.research.google.com/drive/1Mk85P9Vm9jzuuUKtBGhtFxoi5Km1mjrL?usp=sharing)
12. [Functions 1 (Recipe)](https://colab.research.google.com/drive/1S_098_kuB6VBxzmPEskXY2asOTDa7HN8?usp=sharing)
13. [Functions 2 (Agility)](https://colab.research.google.com/drive/1zxTgfTGfCabcd6sSQwilN0nJP2KGaou7?usp=sharing)
14. [Sets](https://colab.research.google.com/drive/166R2AFjUaFXMwMlLVttRdKwXqgN77rmA?usp=sharing)
15. [Dictionaries 1 (Introduction)](https://colab.research.google.com/drive/1z7yFSgpmBHLLTsm9_Fw6B6Z1UIO5qeC5?usp=sharing)
16. [Dictionaries 2 (Manipulating)](https://colab.research.google.com/drive/15UayHeRjwb00VyM9N7q_LGK9XKblErGh?usp=sharing)
17. [Algorithm Complexity](https://colab.research.google.com/drive/1O3CbQWujMfbu9n9zFgeUg1iqc0_uukWz?usp=sharing)
18. [Files 1 (Reading)](https://colab.research.google.com/drive/1AzIeSVVJjBz2tgr6YC9PjetE4Gi-4vwC?usp=sharing)
19. [Files 2 (Writing)](https://colab.research.google.com/drive/1cDJVmMXGU4rc0d4bB6nNAaE_errVddDs?usp=sharing)
20. [Files 3 (Organization)](https://colab.research.google.com/drive/1cfPPGb3P5aaSaYy_9bM1aW7MQEjJsrOx?usp=sharing)
21. [Applications of Programming](https://colab.research.google.com/drive/1Cp1YyYG3FuIaeaHiGZuuwjdlivbeuuWE?usp=sharing)
22. [ICS4U Preview](https://colab.research.google.com/drive/1j1yzLgTWgWvBTU_tnIp8XeCXfWj4cBP3?usp=sharing)

## Documentation exercises

1. [exercise](https://drive.google.com/file/d/1YTU2fuE7zVgGoMSQok8GeYyqxOYzL9lc/view?usp=sharing) [solution](https://drive.google.com/file/d/1mxkIhJRcaqiAmb2DnFuc22_SM05kOZqi/view?usp=sharing)
2. [exercise](https://drive.google.com/file/d/17TuOSxcwdpv1sO7Puk_s7BfopAKBzGYB/view?usp=sharing) [solution](https://drive.google.com/file/d/1XLq9RPulokTlB_4ylQzWPMlesfo5cHG8/view?usp=sharing)
3. [exercise](https://drive.google.com/file/d/1wEKkExZWsKYlMWj8lwTZEGDP3wyENw8J/view?usp=sharing) [solution](https://drive.google.com/file/d/1ampb36VCsiuCbDm3hBtTkntBFinHGmSf/view?usp=sharing)
4. [exercise](https://drive.google.com/file/d/12gXPczXFx7ucmfKfm-jtHYMOU75aGmwm/view?usp=sharing) [solution](https://drive.google.com/file/d/13sWAuuQ-zK-2C-Z-rJiW5III7OBZKjEF/view?usp=sharing)
5. [exercise](https://drive.google.com/file/d/11X-FDrISgqh-BlKKKZ8jQLPhggM4bSnm/view?usp=sharing) [solution](https://drive.google.com/file/d/19jsSjxJBxVLGFgQ2anJs1_2W7wsaAECe/view?usp=sharing)
6. [exercise](https://drive.google.com/file/d/1zOLNSEch8fCJOpZMGocFHd_ne4FQ92et/view?usp=sharing) [solution](https://drive.google.com/file/d/1Q2STKJjt6jcyJeOqa8_Gep25maitcM5h/view?usp=sharing)
7. [exercise](https://drive.google.com/file/d/1gl5vtPTF2Qynfq9FCb5oO70Ji1gT97hH/view?usp=sharing) [solution](https://drive.google.com/file/d/1c1H4XJcFCUgRfnRO6D-sda9isULp_gkc/view?usp=sharing)
8. [exercise](https://drive.google.com/file/d/1wK2-kyv_U0ZzhiLGd5Hc9X3mGFHjT9rG/view?usp=sharing) [solution](https://drive.google.com/file/d/1LzqTGu_9cyrib2JXIBadPEjQnKh9VG14/view?usp=sharing)
9. [exercise](https://drive.google.com/file/d/1uCdK_fzkvw88FcgEDnqGY7fsBd9pVp3k/view?usp=sharing) [solution](https://drive.google.com/file/d/1IooX-te1PzgzC6FbXVPjfG1m4QL9mX3K/view?usp=sharing)

## DMOJ problems

* Intro (math, strings, input/output)
  + [**Not a Wall of Text**](https://dmoj.ca/problem/dmopc15c7p2) [solution](https://drive.google.com/file/d/14osPZ_1w-BLA1KH8VnCNj14pqDZFQZmh/view?usp=sharing)
  + [Core Drill](https://dmoj.ca/problem/dmopc14c5p1)
  + [**A Spooky Season**](https://dmoj.ca/problem/wc16c1j1) [solution](https://drive.google.com/file/d/1xPnoj8G0sp0az6CCF7W-7j_sPcIutprt/view?usp=sharing)
  + [A New Hope](https://dmoj.ca/problem/wc15c2j1)
  + [Next in Line](https://dmoj.ca/problem/ccc13j1)
  + [How’s the Weather](https://dmoj.ca/problem/wc17c1j2)
  + [An Honest Day’s Work](https://dmoj.ca/problem/wc18c3j1)
* Conditions
  + [Winning Score](https://dmoj.ca/problem/ccc19j1)
  + [Telemarketer or not?](https://dmoj.ca/problem/ccc18j1)
  + [Special Day](https://dmoj.ca/problem/ccc15j1)
  + [**Happy or Sad**](https://dmoj.ca/problem/ccc15j2) [solution](https://drive.google.com/file/d/1Tk7Zso0TAT1PvD3yb9u9__EVpEKfVeSM/view?usp=sharing)
  + [C.C. and Cheese-kun](https://dmoj.ca/problem/dmopc16c1p0)
  + [Canadian Calorie-Counting](https://dmoj.ca/problem/ccc06j1)
  + [Who is in the Middle?](https://dmoj.ca/problem/ccc07j1)
* For loops
  + [**Trik**](https://dmoj.ca/problem/coci06c5p1) [solution](https://drive.google.com/file/d/1C57tM04LnDbXwc6_g-5MMgDzJDnCAjEK/view?usp=sharing)
  + [Occupy parking](https://dmoj.ca/problem/ccc18j2)
  + [**Multiple Choice**](https://dmoj.ca/problem/ccc11s2) solution [A](https://drive.google.com/file/d/1hd-za0b97i1dEoEAYbXvkHmPEDPa6z0i/view?usp=sharing) | [B](https://drive.google.com/file/d/1D94rVDRlqAHZ15MPLuzWEB0v1VMT0N0x/view?usp=sharing)
  + [**Uncrackable**](https://dmoj.ca/problem/wc17c3j3) [solution](https://drive.google.com/file/d/1hsAl3Kypr6iuOKNNsSG1t_lvwO0uEpOW/view?usp=sharing)
* While loops
  + [**Slot Machines**](https://dmoj.ca/problem/ccc00s1) [solution](https://drive.google.com/file/d/16g5vAdd5RwSMr29JJXJmBHg3hKLLnfK6/view?usp=sharing)
  + [Do the Shuffle](https://dmoj.ca/problem/ccc08j2)
  + [Kemija](https://dmoj.ca/problem/coci08c3p2)
  + [**Epidemiology**](https://dmoj.ca/problem/ccc20j2) solution [A](https://drive.google.com/file/d/10FdNCm_n3gRn35TtGSFfV8nVWiixCkBh/view?usp=sharing) | [B](https://drive.google.com/file/d/1RlGqhYgLwkAbON6SSODlDEITdw5KUJbF/view?usp=sharing) | [C](https://drive.google.com/file/d/1A4NFkIuRwif08WxSnV5QfB22tCZH_as7/view?usp=sharing)
  + [Ptice](https://dmoj.ca/problem/coci08c1p2)
  + [AmeriCanadian](https://dmoj.ca/problem/ccc02j2)
  + [Take a Number](https://dmoj.ca/problem/ecoo13r1p1)
  + [When You Eat Your Smarties](https://dmoj.ca/problem/ecoo15r1p1)
  + [Cold Compress](https://dmoj.ca/problem/ccc19j3)
* Lists
  + [Voronoi Village](https://dmoj.ca/problem/ccc18s1)
  + [Munch ’n’ Brunch](https://dmoj.ca/problem/ecoo17r1p1)
  + [Baker Bonus](https://dmoj.ca/problem/ecoo17r3p1)
  + [**Deal or No Deal Calculator**](https://dmoj.ca/problem/ccc07j3) [solution](https://drive.google.com/file/d/1ZlNeTjxz621d2Z4kQYTCkQS_doGsKgFI/view?usp=sharing)
  + [**Cezar**](https://dmoj.ca/problem/coci17c1p1) [stub](https://drive.google.com/file/d/1u5e6erWnqQuQc4wrCZAOQ6kxHvuJ7Wib/view?usp=sharing) [solution](https://drive.google.com/file/d/1TGOR_QOAlrBdHBlEWDvH_bKZHJkgy4xU/view?usp=sharing)
  + [Preokret](https://dmoj.ca/problem/coci18c2p1)
  + [Babbling Brooks](https://dmoj.ca/problem/ccc00s2)
  + [**Tides**](https://dmoj.ca/problem/dmopc14c7p2) [solution](https://drive.google.com/file/d/1yDm7kl4KAMjEaIyzw6Xw_2h3Q-VGA79H/view?usp=sharing)
  + [Wesley Plays DDR](https://dmoj.ca/problem/wac3p3)
  + [Emacs](https://dmoj.ca/problem/coci19c5p1)
  + [Crtanje](https://dmoj.ca/problem/coci20c2p1)
  + [Charlie’s Crazy Conquest](https://dmoj.ca/problem/dmopc19c5p2)
* Functions
  + [Card Game](https://dmoj.ca/problem/ccc99s1)
  + [Cleaning the Room](https://acm.timus.ru/problem.aspx?space=1&num=2144)
  + [**From 1987 to 2013**](https://dmoj.ca/problem/ccc13s1) [solution](https://drive.google.com/file/d/1worN2bIw9F22yflZMkVpazav8uaEWbcf/view?usp=sharing)
  + [Are We There Yet?](https://dmoj.ca/problem/ccc18j3)
  + [Decoding DNA](https://dmoj.ca/problem/ecoo12r1p2)
  + [Plateforme](https://dmoj.ca/problem/crci07p1)
  + [Misa](https://dmoj.ca/problem/coci13c2p2)
* Sets
  + [**Email**](https://dmoj.ca/problem/ecoo19r2p1)[stub](https://drive.google.com/file/d/13ggfoRZ4ggJQxZRm93nNiLkP23KAWSSK/view?usp=sharing) solution [A](https://drive.google.com/file/d/1EEB9nkTp4WGMzmENX4i35ccwK_Q54E1S/view?usp=sharing) | [B](https://drive.google.com/file/d/1yOtl5Ix3y0pLyw8FH2pPwBvh-mbVEOoc/view?usp=sharing)
  + [Bard](https://dmoj.ca/problem/crci06p1)
* Dictionaries
  + [Cities and States](http://www.usaco.org/index.php?page=viewproblem2&cpid=667)
  + [Common Words](https://dmoj.ca/problem/cco99p2)
  + [Conspicuous Cryptic Checklist](https://dmoj.ca/problem/dmopc19c5p1)
  + [Marko](https://dmoj.ca/problem/coci15c2p1)
  + [**Attack of the CipherTexts**](https://dmoj.ca/problem/ccc06s2) [stub](https://drive.google.com/file/d/1Hzs6LOk7x4Ofs7DmFfEEGhPvixcJSr_Z/view?usp=sharing) [solution](https://drive.google.com/file/d/1DAhLzpDxcxt6bfJoq2rt_Y6AZOTecOHM/view?usp=sharing)
  + [Mode Finding](https://dmoj.ca/problem/dmopc19c3p1)
  + [**Utrka**](https://dmoj.ca/problem/coci14c2p2) [attempt 1](https://drive.google.com/file/d/1iN40bf_JHyQbc-suN87uuD5ajKUt9fdr/view?usp=sharing) [solution](https://drive.google.com/file/d/12dHI8uVskWcnyzTMMSUWqG9dUVC9yiR5/view?usp=sharing)
  + [ZigZag](https://dmoj.ca/problem/coci17c2p2)

## Misc. resources

* [PEP 8 — Python Style Guide](https://www.python.org/dev/peps/pep-0008/)
* [Learn to Code by Solving Problems](https://www.penguinrandomhouse.com/books/670339/learn-to-code-by-solving-problems-by-daniel-zingaro/) (Dr. Daniel Zingaro), the basis of the unit
* [DMOJ](https://dmoj.ca/) (online repository of problems with solution checker; must make a free account)
* [ICS3U curriculum](http://www.edu.gov.on.ca/eng/curriculum/secondary/computer10to12_2008.pdf#page=41) & [ICS4U curriculum](http://www.edu.gov.on.ca/eng/curriculum/secondary/computer10to12_2008.pdf#page=57)

## Licence

This content is [licenced](https://drive.google.com/file/d/1TZkdN_nRJhIGigkmj7F0WaY77VSNkr50/view?usp=sharing) under GNU GPL v3.0, summarized below (from [choosealicence.com](https://choosealicense.com/licenses/gpl-3.0/)). In short, you may use, modify, and distribute it, as long as you do not obscure the source or change the licence, and understanding that there is no warranty or liability provided for its use.

| **Permissions** | **Conditions** | **Limitations** |
| --- | --- | --- |
| * Commercial use * Distribution * Modification * Patent use * Private use | * Disclose source * License and copyright notice * Same license * State changes | * Liability * Warranty |

1. One-time operation to enable the opening of these files: Go to your Google Drive home; click New → More → Connect other apps → Google Colaboratory. [↑](#footnote-ref-0)