**UBCx: How to Code: Simple Data**

**Learn the secret to writing well-tested and easy to improve programs, that will set you up to master any programming language**

**What you'll learn**

**How to represent information as data**

**How to focus each part of your program on a single task**

**How to use examples and tests to clarify what your program should do**

**How to simplify the structure of your program using common patterns**

**Recognize and represent more complicated information**

**Instructor**

**Gregor Kiczales
Professor, Computer Science •
University of British Columbia**

**Course contents:**

**0: Introduction**

[**1. Welcome**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@348790b506ce479789ffd6c227d1bc9d)

[**2. Syllabus**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@044aa02b1c6a4911ac519b11d2459526)

[**3. Grading**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@16204ff98b474c4fa48b0ee4e821330d)

[**4. Study Tips**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@ce62429af48f406eaa792520ef45cd06)

[**5. Student Perspective**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@959b4a28f4474babafefa0754eb4f254)

[**6. Course Team**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@3954712a3473429bac863e0fa2cf3ca6)

[**7. Pre-Course Survey**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@be14d2d9d207493db2e3468532743e86)

**1a: Beginning Student Language**

[**1. Module Overview**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@fa08e51ddc0743a79c9823a0bc13e4f1)

[**2. Expressions**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@2eb6b177ed8d4374ab279fd78c2b337c)

[**3. Evaluation**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@60763096eda3412aae56aefe24a3bb70)

[**4. Strings and Images**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@5a29150ded3e404eade04430097cf822)

[**5. Constant Definitions**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@0160eedde0204a8cbb80134db48dd7b5)

[**6. Function Definitions**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@17fdea1431fc42c3af6410358949c0f8)

[**7. Booleans and if Expressions**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@13acfad83fc345f49830000dbd2d3e53)

[**8. Using the Stepper**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@df2f152cd7b94c4082984b0afa050b2f)

[**9. Discovering Primitives**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@e2560fbe4e0249eebc1fc028024b60e4)

[**10. Practice Problems**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@ea5dd1903126464b8861b5db659eae9c)

**1b: How to Design Functions**

[**1. Module Overview**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@464765fda50c445db8207eac5126dd5f)

[**2. Full Speed HtDF Recipe**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@91cb8a8775cf492da3618d5801b8f40d)

[**3. Slow Motion HtDF Recipe**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@f2f4d82a756141e19113dfc28ee12ce4)

[**4. A Simple Practice Example**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@56d48a1f19164293bbbb56b4340839b9)

[**5. When Tests are Incorrect**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@4663540a0b6040178522aaac35a849e3)

[**6. Varying Recipe Order**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@5fc118b4a7094d818d4e838ddcbcaf68)

[**7. Poorly Formed Problems**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@f873dda228124332acd9aeb6620fe1de)

[**8. Practice Problems**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@6fd5869878b340c5b22a53cd4ddaaec1)

[**9. Quiz**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@9920ce16a9824990b564c0b3a4db5e03)

**2: How to Design Data**

[**1. Module Overview**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@9d0a6a91420c46be9f21d41262ae06e8)

[**2. cond Expressions**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@dcd5c9f5cf1644869163ecbdde310c27)

[**3. Data Definitions**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@2339eb0a13134657a890810c5a6ef016)

[**4. Atomic Non-Distinct**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@ef39ac26d6eb47b1b6648538ee3625bc)

[**5. HtDF With Non-Primitive Data**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@3ccd6609b2884d4390e0276bf4f49edc)

[**6. HtDF X Structure of Data Orthogonality**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@1d9ea5e42fed419b9f47e55d60fad1fb)

[**7. Interval**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@2c54c711941e401cae692f842946cce3)

[**8. Enumeration**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@0c6595fa0d6347e4b026faa1e2c7cafc)

[**9. Itemization**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@1c2889eb6d814f189111d77677f45d04)

[**10. HtDF with Interval**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@7083d565eadb4d1f83824224a0967559)

[**11. HtDF with Enumeration**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@2a66e05d715b4fb3a2e3c5f14bd90a53)

[**12. HtDF with Itemization**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@cd6e3cd1ae42422db29cb304cddbdcf2)

[**13. Structure of Information Flows Through**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@8432b3773cf7473aa384a79bd134c140)

[**14. Practice Problems**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@f6af145d56604212ba815f86f2c52067)

[**15. Quiz**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@289df1216d724be58a20c5adf155bdac)

**3a: How to Design Worlds**

[**1. Module Overview**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@065a46bb2f7a404faf33e7f5609241ac)

[**2. Interactive Programs**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@0240360320ce42eb8abf19b3e633d11b)

[**3. The big-bang Mechanism**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@39a5d673709341aba03a2bc6c528fbd7)

[**4. Domain Analysis**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@e019c2cc57f74b85a41b80fbc819e0fd)

[**5. Program through main Function**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@3888dc5d3bc24717999c85d2f3094326)

[**6. Working through the Wish List**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@1119024c1afa48d3b5d0b84bf770d5ad)

[**7. Improving a World Program - Add SPEED**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@b95b45d1f0334df8ae9b96cf8420522f)

[**8. Improving a World Program - Add key handler**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@14aa9236c8ca4468bca41234d7e67458)

[**9. Practice Problems**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@ecce86439883487f9365b0de8afb54b1)

**3b: Compound Data**

[**1. Module Overview**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@2625359a33f7444b9b5ed1e230473dd8)

[**2. define-struct**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@f6b6dc730de34ebeb412cd1434f57069)

[**3. Compound Data Definitions**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@e25465c210324c259e8be875bd690a7d)

[**4. Practice Problems - Compound Data**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@a97a5d6851f641839d11e70c2dce43ba)

[**5. HtDW With Compound Data**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@8419733c89f348b9a8ffe2fe29c6d77c)

[**6. Practice Problems - HtDW with Compound Data**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@7b3aea4daee8469194731b80bf380c80)

[**7. Design Quiz**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@4e532039de94464889be125f804b7efb)

**4a: Self-Reference**

[**1. Module Overview**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@c7109abf99b04918a21552556974ab5e)

[**2. Introduction to Arbitrary Sized Data**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@94c179d4d0a1479c9ac36c115fd45228)

[**3. List Mechanisms**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@02380ffe51d947758abe012b88bc94f2)

[**4. List Data Definition**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@6a35fbc973784185893c0e6ff8f007b0)

[**5. Function Operating on List**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@f0afc4902a144e76a83c48d57bf71bde)

[**6. Revising the Recipes for Lists**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@7fd9e6b30a814e06ac32ec4d49069da3)

[**7. Designing with Lists**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@317fb1cf6f0940a1b559d2ef1e7eeb8d)

[**8. Positions in List Templates**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@cd89e82c29794afb9223351275a5d139)

[**9. Practice Problems**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@622091b7a756427abf17675da71cf59a)

**4b: Reference**

[**1. Module Overview**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@216b08555bf14b9ea979fa8601ae9c32)

[**2. The Reference Rule Part 1**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@a5cf3ae24fe54766ae46ecfc6d156c18)

[**3. The Reference Rule Part 2**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@14e8c25719fa4edbaffc6bb639448715)

[**4. The Reference Rule Part 3**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@d3dd950e3810420395fc2130e05fe553)

[**5. Practice Problems**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@297afec312604bf0adb83de224570115)

[**6. Quiz**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@83450cc787704ea3b8eb537caf82feda)

[**7. Video Contest**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@ca9da7ac0a28463b86e6a0e5afd6c379)

**5a: Naturals**

[**1. Module Overview**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@8430646b056740618c62dfe35090b52a)

[**2. Natural Numbers**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@86df315295d74647a7e4938e143f7f79)

[**3. A Parlor Trick**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@6b050e1127b94d6e88c7c7c116acdc09)

[**4. Practice Problems**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@7fda2b3d23234d08b2d9f52a14c1693c)

**5b: Helpers**

[**1. Module Overview**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@f548d9444f88452299ba7cfce73e9c6b)

[**2. Introduction**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@e2b12372dbf94e729e4171f80f1e5bd7)

[**3. Function Composition**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@2af2a1e4604d40efb873b43f559165a9)

[**4. Laying Out a List of Images**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@a6ce2180ed8442499b177904d97f9ddf)

[**5. Operating on a List**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@16cae5f3e9f14f3fb17ba542c0104b30)

[**6. Domain Knowledge Shift**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@b636f6905cb948c99ba5269671c6e101)

[**7. The Last Helper**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@93943d8e80044af39b621747a8836785)

[**8. Practice Problems**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@8146a6a43aa14d688c70287f7064a3f2)

[**9. Design Quiz**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@b5b0862f578b4e9383088b43da2e8ced)

**6: Binary Search Trees**

[**1. Module Overview**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@0cb5a537b1714a70abcd82d186526155)

[**2. List Abbreviations**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@dab721cc26cc46ab9554f110be68800d)

[**3. List of Account**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@25b2dac5ead44764a0b2dfa2e52a08c9)

[**4. BSTs**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@0d7e9ce3f15b47369b49818d5b00ae11)

[**5. A Data Definition for BSTs**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@f046b4d4605a482e80972ef15000610a)

[**6. Lookup in BSTs**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@a37e5471458e4a91b37c6e69a246858c)

[**7. Rendering BSTs**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@06e9161fd51249ef85143c95a0a0e8f3)

[**8. Practice Problems**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@0719121cfb44418a93b38ba7f801cbe1)

**The Career Development Series**

[**1. Introducing: The Career Development Series**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@e95b678f46b1436e9e76c6c465bcc537)

[**2. Technical Interviews**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@82372076874c4afc937931920fcebe7c)

[**3. Taking Your Suggestions**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@28d6735986ff49cca93b6ebf80580743)

**Worked Problems**

[**1. Worked Problems**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@1c2369273c3247da8007d1c9e8d756e1)

[**2. Video Contest**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@5b986df255304f37a8c09158b5b332f2)

**Final Project**

[**1. Final Project: Space Invaders**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@9e986448fdf74a20a6df8a9d3adce98d)

**Instructor QA**

[**1. Instructor QA**](https://learning.edx.org/course/course-v1:UBCx+HtC1x+2T2017/block-v1:UBCx+HtC1x+2T2017+type@sequential+block@113b1f4f773a4003960f8f96437dd89c)