

Codeforces Online Judge

Prepared by: Mohamed Ayman

Algorithm Engineer at Valeo

Deep Learning Researcher

Teaching Assistant at The American University in Cairo (AUC)

spring 2020

Valeo



THE AMERICAN
UNIVERSITY IN CAIRO



sw.eng.MohamedAyman@gmail.com



facebook.com/cs.MohamedAyman



linkedin.com/in/cs-MohamedAyman



codeforces.com/profile/Mohamed_Ayman

Codeforces Online Judge - Phase 2.3

Lecture Agenda

We will discuss in this lecture
the following topics

- | | |
|----------------------------|---------------|
| 1- Data Structure Problems | [16 problems] |
| 2- Mathematical Problems | [27 problems] |
| 3- String Problems | [16 problems] |
| 4- Greedy Problems | [27 problems] |
| 5- Brute Force Problems | [8 problems] |



Let's
STARTUP

Lecture Agenda

Section 1: Data Structure Problems

Section 2: Mathematical Problems

Section 3: String Problems

Section 4: Greedy Problems

Section 5: Brute Force Problems



Data Structure Problems

- [01] CF-Round 333: <http://codeforces.com/problemset/problem/602/B>
- [02] CF-Round 346: <http://codeforces.com/problemset/problem/659/B>
- [03] CF-Round 369: <http://codeforces.com/problemset/problem/711/B>
- [04] CF-Round 138: <http://codeforces.com/problemset/problem/224/B>
- [05] CF-Round 147: <http://codeforces.com/problemset/problem/237/B>
- [06] CF-Round 181: <http://codeforces.com/problemset/problem/300/B>
- [07] CF-Round 193: <http://codeforces.com/problemset/problem/332/B>
- [08] CF-Round 194: <http://codeforces.com/problemset/problem/334/B>
- [09] CF-Round 216: <http://codeforces.com/problemset/problem/369/B>
- [10] CF-Round 249: <http://codeforces.com/problemset/problem/435/B>
- [11] CF-Round 254: <http://codeforces.com/problemset/problem/445/B>
- [12] CF-Round 279: <http://codeforces.com/problemset/problem/490/B>
- [13] CF-Round 286: <http://codeforces.com/problemset/problem/505/B>
- [14] CF-Round 296: <http://codeforces.com/problemset/problem/527/B>
- [15] CF-Round 297: <http://codeforces.com/problemset/problem/525/B>
- [16] CF-Round 306: <http://codeforces.com/problemset/problem/550/B>



Data Structure Problems Solution

- [01] CF-Round 333: <http://codeforces.com/contest/602/submission/53813039>
- [02] CF-Round 346: <http://codeforces.com/contest/659/submission/53823305>
- [03] CF-Round 369: <http://codeforces.com/contest/711/submission/53841947>
- [04] CF-Round 138: <http://codeforces.com/contest/224/submission/54437485>
- [05] CF-Round 147: <http://codeforces.com/contest/237/submission/54437777>
- [06] CF-Round 181: <http://codeforces.com/contest/300/submission/54438438>
- [07] CF-Round 193: <http://codeforces.com/contest/332/submission/54438739>
- [08] CF-Round 194: <http://codeforces.com/contest/334/submission/54439030>
- [09] CF-Round 216: <http://codeforces.com/contest/369/submission/54442230>
- [10] CF-Round 249: <http://codeforces.com/contest/435/submission/53842185>
- [11] CF-Round 254: <http://codeforces.com/contest/445/submission/53842629>
- [12] CF-Round 279: <http://codeforces.com/contest/490/submission/53849398>
- [13] CF-Round 286: <http://codeforces.com/contest/505/submission/53850402>
- [14] CF-Round 296: <http://codeforces.com/contest/527/submission/53868739>
- [15] CF-Round 297: <http://codeforces.com/contest/525/submission/53868869>
- [16] CF-Round 306: <http://codeforces.com/contest/550/submission/53868971>



Data Structure Problems

- [17] CF-Round 318: <http://codeforces.com/problemset/problem/574/B>
- [18] CF-Round 324: <http://codeforces.com/problemset/problem/584/B>
- [19] CF-Round 139: <http://codeforces.com/problemset/problem/225/B>
- [20] CF-Round 338: <http://codeforces.com/problemset/problem/615/B>
- [21] CF-Round 133: <http://codeforces.com/problemset/problem/216/B>
- [22] CF-Round 178: <http://codeforces.com/problemset/problem/294/B>
- [23] CF-Round 202: <http://codeforces.com/problemset/problem/349/B>
- [24] CF-Round 100: <http://codeforces.com/problemset/problem/140/B>



Data Structure Problems Solution

- [17] CF-Round 318: <http://codeforces.com/contest/574/submission/53870856>
- [18] CF-Round 324: <http://codeforces.com/contest/584/submission/53870612>
- [19] CF-Round 139: <http://codeforces.com/contest/225/submission/54087748>
- [20] CF-Round 338: <http://codeforces.com/contest/615/submission/54168051>
- [21] CF-Round 133: <http://codeforces.com/contest/216/submission/54227213>
- [22] CF-Round 178: <http://codeforces.com/contest/294/submission/54229588>
- [23] CF-Round 202: <http://codeforces.com/contest/349/submission/54407793>
- [24] CF-Round 100: <http://codeforces.com/contest/140/submission/54372082>





Lecture Agenda

✓ Section 1: Data Structure Problems

Section 2: Mathematical Problems

Section 3: String Problems

Section 4: Greedy Problems

Section 5: Brute Force Problems



Mathematical Problems

- [01] CF-Round 295: <http://codeforces.com/problemset/problem/520/B>
- [02] CF-Round 298: <http://codeforces.com/problemset/problem/534/B>
- [03] CF-Round 300: <http://codeforces.com/problemset/problem/538/B>
- [04] CF-Round 326: <http://codeforces.com/problemset/problem/588/B>
- [05] CF-Round 355: <http://codeforces.com/problemset/problem/677/B>
- [06] CF-Round 365: <http://codeforces.com/problemset/problem/703/B>
- [07] CF-Round 391: <http://codeforces.com/problemset/problem/757/B>
- [08] CF-Round 135: <http://codeforces.com/problemset/problem/219/B>
- [09] CF-Round 237: <http://codeforces.com/problemset/problem/404/B>
- [10] CF-Round 240: <http://codeforces.com/problemset/problem/415/B>
- [11] CF-Round 250: <http://codeforces.com/problemset/problem/437/B>
- [12] CF-Round 262: <http://codeforces.com/problemset/problem/460/B>
- [13] CF-Round 353: <http://codeforces.com/problemset/problem/675/B>
- [14] CF-Round 120: <http://codeforces.com/problemset/problem/190/B>
- [15] CF-Round 184: <http://codeforces.com/problemset/problem/305/B>
- [16] CF-Round 190: <http://codeforces.com/problemset/problem/322/B>



Mathematical Problems Solution

- [01] CF-Round 295: <http://codeforces.com/contest/520/submission/53811276>
- [02] CF-Round 298: <http://codeforces.com/contest/534/submission/53811314>
- [03] CF-Round 300: <http://codeforces.com/contest/538/submission/53811405>
- [04] CF-Round 326: <http://codeforces.com/contest/588/submission/53812893>
- [05] CF-Round 355: <http://codeforces.com/contest/677/submission/53840097>
- [06] CF-Round 365: <http://codeforces.com/contest/703/submission/53840667>
- [07] CF-Round 391: <http://codeforces.com/contest/757/submission/54436998>
- [08] CF-Round 135: <http://codeforces.com/contest/219/submission/54437143>
- [09] CF-Round 237: <http://codeforces.com/contest/404/submission/54444054>
- [10] CF-Round 240: <http://codeforces.com/contest/415/submission/54444114>
- [11] CF-Round 250: <http://codeforces.com/contest/437/submission/53842296>
- [12] CF-Round 262: <http://codeforces.com/contest/460/submission/53849205>
- [13] CF-Round 353: <http://codeforces.com/contest/675/submission/53871411>
- [14] CF-Round 120: <http://codeforces.com/contest/190/submission/54087386>
- [15] CF-Round 184: <http://codeforces.com/contest/305/submission/54160614>
- [16] CF-Round 190: <http://codeforces.com/contest/322/submission/54160818>



Mathematical Problems

- [17] CF-Round 219: <http://codeforces.com/problemset/problem/373/B>
- [18] CF-Round 282: <http://codeforces.com/problemset/problem/495/B>
- [19] CF-Round 329: <http://codeforces.com/problemset/problem/593/B>
- [20] CF-Round 330: <http://codeforces.com/problemset/problem/595/B>
- [21] CF-Round 172: <http://codeforces.com/problemset/problem/281/B>
- [22] CF-Round 266: <http://codeforces.com/problemset/problem/466/B>
- [23] CF-Round 275: <http://codeforces.com/problemset/problem/483/B>
- [24] CF-Round 125: <http://codeforces.com/problemset/problem/199/B>
- [25] CF-Round 195: <http://codeforces.com/problemset/problem/336/B>
- [26] CF-Round 113: <http://codeforces.com/problemset/problem/166/B>
- [27] CF-Round 198: <http://codeforces.com/problemset/problem/340/B>
- [28] CF-Round 224: <http://codeforces.com/problemset/problem/382/B>
- [29] CF-Round 116: <http://codeforces.com/problemset/problem/180/B>



Mathematical Problems Solution

- [17] CF-Round 219: <http://codeforces.com/contest/373/submission/54164599>
- [18] CF-Round 282: <http://codeforces.com/contest/495/submission/54165383>
- [19] CF-Round 329: <http://codeforces.com/contest/593/submission/54165754>
- [20] CF-Round 330: <http://codeforces.com/contest/595/submission/54167684>
- [21] CF-Round 172: <http://codeforces.com/contest/281/submission/54229138>
- [22] CF-Round 266: <http://codeforces.com/contest/466/submission/54372703>
- [23] CF-Round 275: <http://codeforces.com/contest/483/submission/54372838>
- [24] CF-Round 125: <http://codeforces.com/contest/199/submission/53896765>
- [25] CF-Round 195: <http://codeforces.com/contest/336/submission/53897172>
- [26] CF-Round 113: <http://codeforces.com/contest/166/submission/53899529>
- [27] CF-Round 198: <http://codeforces.com/contest/340/submission/54457824>
- [28] CF-Round 224: <http://codeforces.com/contest/382/submission/53908869>
- [29] CF-Round 116: <http://codeforces.com/contest/180/submission/54016248>





Lecture Agenda

✓ Section 1: Data Structure Problems

✓ Section 2: Mathematical Problems

Section 3: String Problems

Section 4: Greedy Problems

Section 5: Brute Force Problems



String Problems

- [01] CF-Round 256: <http://codeforces.com/problemset/problem/448/B>
- [02] CF-Round 362: <http://codeforces.com/problemset/problem/697/B>
- [03] CF-Round 372: <http://codeforces.com/problemset/problem/716/B>
- [04] CF-Round 373: <http://codeforces.com/problemset/problem/719/B>
- [05] CF-Round 148: <http://codeforces.com/problemset/problem/239/B>
- [06] CF-Round 170: <http://codeforces.com/problemset/problem/278/B>
- [07] CF-Round 173: <http://codeforces.com/problemset/problem/282/B>
- [08] CF-Round 199: <http://codeforces.com/problemset/problem/342/B>
- [09] CF-Round 208: <http://codeforces.com/problemset/problem/358/B>
- [10] CF-Round 253: <http://codeforces.com/problemset/problem/443/B>
- [11] CF-Round 293: <http://codeforces.com/problemset/problem/518/B>
- [12] CF-Round 336: <http://codeforces.com/problemset/problem/608/B>
- [13] CF-Round 389: <http://codeforces.com/problemset/problem/752/B>
- [14] CF-Round 106: <http://codeforces.com/problemset/problem/149/B>
- [15] CF-Round 158: <http://codeforces.com/problemset/problem/260/B>
- [16] CF-Round 168: <http://codeforces.com/problemset/problem/275/B>



String Problems Solution

- [01] CF-Round 256: <http://codeforces.com/contest/448/submission/53673230>
- [02] CF-Round 362: <http://codeforces.com/contest/697/submission/53840185>
- [03] CF-Round 372: <http://codeforces.com/contest/716/submission/53842011>
- [04] CF-Round 373: <http://codeforces.com/contest/719/submission/53842083>
- [05] CF-Round 148: <http://codeforces.com/contest/239/submission/54437876>
- [06] CF-Round 170: <http://codeforces.com/contest/278/submission/54438145>
- [07] CF-Round 173: <http://codeforces.com/contest/282/submission/54438195>
- [08] CF-Round 199: <http://codeforces.com/contest/342/submission/54442087>
- [09] CF-Round 208: <http://codeforces.com/contest/358/submission/54442160>
- [10] CF-Round 253: <http://codeforces.com/contest/443/submission/53842681>
- [11] CF-Round 293: <http://codeforces.com/contest/518/submission/53852962>
- [12] CF-Round 336: <http://codeforces.com/contest/608/submission/53871126>
- [13] CF-Round 389: <http://codeforces.com/contest/752/submission/54084953>
- [14] CF-Round 106: <http://codeforces.com/contest/149/submission/54087310>
- [15] CF-Round 158: <http://codeforces.com/contest/260/submission/54089422>
- [16] CF-Round 168: <http://codeforces.com/contest/275/submission/54090690>



String Problems

- [17] CF-Round 335: <http://codeforces.com/problemset/problem/606/B>
- [18] CF-Round 114: <http://codeforces.com/problemset/problem/168/B>
- [19] CF-Round 127: <http://codeforces.com/problemset/problem/202/B>
- [20] CF-Round 130: <http://codeforces.com/problemset/problem/208/B>
- [21] CF-Round 307: <http://codeforces.com/problemset/problem/551/B>
- [22] CF-Round 347: <http://codeforces.com/problemset/problem/664/B>
- [23] CF-Round 233: <http://codeforces.com/problemset/problem/399/B>
- [24] CF-Round 179: <http://codeforces.com/problemset/problem/296/B>



String Problems Solution

- [17] CF-Round 335: <http://codeforces.com/contest/606/submission/54167951>
- [18] CF-Round 114: <http://codeforces.com/contest/168/submission/54174211>
- [19] CF-Round 127: <http://codeforces.com/contest/202/submission/54227212>
- [20] CF-Round 130: <http://codeforces.com/contest/208/submission/54372241>
- [21] CF-Round 307: <http://codeforces.com/contest/551/submission/54407016>
- [22] CF-Round 347: <http://codeforces.com/contest/664/submission/54407235>
- [23] CF-Round 233: <http://codeforces.com/contest/399/submission/53897469>
- [24] CF-Round 179: <http://codeforces.com/contest/296/submission/53899830>





Lecture Agenda

✓ Section 1: Data Structure Problems

✓ Section 2: Mathematical Problems

✓ Section 3: String Problems

Section 4: Greedy Problems

Section 5: Brute Force Problems



Greedy Problems

- [01] CF-Round 339: <http://codeforces.com/problemset/problem/614/B>
- [02] CF-Round 351: <http://codeforces.com/problemset/problem/673/B>
- [03] CF-Round 363: <http://codeforces.com/problemset/problem/699/B>
- [04] CF-Round 385: <http://codeforces.com/problemset/problem/745/B>
- [05] CF-Round 105: <http://codeforces.com/problemset/problem/148/B>
- [06] CF-Round 112: <http://codeforces.com/problemset/problem/165/B>
- [07] CF-Round 189: <http://codeforces.com/problemset/problem/320/B>
- [08] CF-Round 225: <http://codeforces.com/problemset/problem/384/B>
- [09] CF-Round 281: <http://codeforces.com/problemset/problem/493/B>
- [10] CF-Round 290: <http://codeforces.com/problemset/problem/510/B>
- [11] CF-Round 311: <http://codeforces.com/problemset/problem/557/B>
- [12] CF-Round 321: <http://codeforces.com/problemset/problem/580/B>
- [13] CF-Round 332: <http://codeforces.com/problemset/problem/599/B>
- [14] CF-Round 354: <http://codeforces.com/problemset/problem/676/B>
- [15] CF-Round 383: <http://codeforces.com/problemset/problem/742/B>
- [16] CF-Round 393: <http://codeforces.com/problemset/problem/760/B>



Greedy Problems Solution

- [01] CF-Round 339: <http://codeforces.com/contest/614/submission/53823238>
- [02] CF-Round 351: <http://codeforces.com/contest/673/submission/53839900>
- [03] CF-Round 363: <http://codeforces.com/contest/699/submission/53840315>
- [04] CF-Round 385: <http://codeforces.com/contest/745/submission/54436945>
- [05] CF-Round 105: <http://codeforces.com/contest/148/submission/54437051>
- [06] CF-Round 112: <http://codeforces.com/contest/165/submission/54437113>
- [07] CF-Round 189: <http://codeforces.com/contest/320/submission/54438607>
- [08] CF-Round 225: <http://codeforces.com/contest/384/submission/54444003>
- [09] CF-Round 281: <http://codeforces.com/contest/493/submission/53849602>
- [10] CF-Round 290: <http://codeforces.com/contest/510/submission/53850936>
- [11] CF-Round 311: <http://codeforces.com/contest/557/submission/53868996>
- [12] CF-Round 321: <http://codeforces.com/contest/580/submission/53870571>
- [13] CF-Round 332: <http://codeforces.com/contest/599/submission/53870969>
- [14] CF-Round 354: <http://codeforces.com/contest/676/submission/53871560>
- [15] CF-Round 383: <http://codeforces.com/contest/742/submission/54084812>
- [16] CF-Round 393: <http://codeforces.com/contest/760/submission/54086841>



Greedy Problems

- [17] CF-Round 143: <http://codeforces.com/problemset/problem/231/B>
- [18] CF-Round 203: <http://codeforces.com/problemset/problem/350/B>
- [19] CF-Round 220: <http://codeforces.com/problemset/problem/374/B>
- [20] CF-Round 230: <http://codeforces.com/problemset/problem/393/B>
- [21] CF-Round 361: <http://codeforces.com/problemset/problem/689/B>
- [22] CF-Round 399: <http://codeforces.com/problemset/problem/768/B>
- [23] CF-Round 176: <http://codeforces.com/problemset/problem/287/B>
- [24] CF-Round 301: <http://codeforces.com/problemset/problem/540/B>
- [25] CF-Round 205: <http://codeforces.com/problemset/problem/353/B>
- [26] CF-Round 229: <http://codeforces.com/problemset/problem/390/B>
- [27] CF-Round 319: <http://codeforces.com/problemset/problem/577/B>



Greedy Problems Solution

- [17] CF-Round 143: <http://codeforces.com/contest/231/submission/54088968>
- [18] CF-Round 203: <http://codeforces.com/contest/350/submission/54161000>
- [19] CF-Round 220: <http://codeforces.com/contest/374/submission/54164728>
- [20] CF-Round 230: <http://codeforces.com/contest/393/submission/54165081>
- [21] CF-Round 361: <http://codeforces.com/contest/689/submission/54170258>
- [22] CF-Round 399: <http://codeforces.com/contest/768/submission/54170508>
- [23] CF-Round 176: <http://codeforces.com/contest/287/submission/54229471>
- [24] CF-Round 301: <http://codeforces.com/contest/540/submission/54407326>
- [25] CF-Round 205: <http://codeforces.com/contest/353/submission/54372401>
- [26] CF-Round 229: <http://codeforces.com/contest/390/submission/54372466>
- [27] CF-Round 319: <http://codeforces.com/contest/577/submission/54407091>





Lecture Agenda

- ✓ Section 1: Data Structure Problems
- ✓ Section 2: Mathematical Problems
- ✓ Section 3: String Problems
- ✓ Section 4: Greedy Problems

Section 5: Brute Force Problems



Brute Force Problems

- [01] CF-Round 144: <http://codeforces.com/problemset/problem/233/B>
- [02] CF-Round 155: <http://codeforces.com/problemset/problem/254/B>
- [03] CF-Round 283: <http://codeforces.com/problemset/problem/496/B>
- [04] CF-Round 131: <http://codeforces.com/problemset/problem/214/B>
- [05] CF-Round 150: <http://codeforces.com/problemset/problem/244/B>
- [06] CF-Round 153: <http://codeforces.com/problemset/problem/252/B>
- [07] CF-Round 278: <http://codeforces.com/problemset/problem/488/B>
- [08] CF-Round 398: <http://codeforces.com/problemset/problem/767/B>



Brute Force Problems Solution

- [01] CF-Round 144: <http://codeforces.com/contest/233/submission/54437596>
- [02] CF-Round 155: <http://codeforces.com/contest/254/submission/54438049>
- [03] CF-Round 283: <http://codeforces.com/contest/496/submission/53849760>
- [04] CF-Round 131: <http://codeforces.com/contest/214/submission/54087676>
- [05] CF-Round 150: <http://codeforces.com/contest/244/submission/54089071>
- [06] CF-Round 153: <http://codeforces.com/contest/252/submission/54227354>
- [07] CF-Round 278: <http://codeforces.com/contest/488/submission/54373011>
- [08] CF-Round 398: <http://codeforces.com/contest/767/submission/54016134>



Lecture Agenda

- ✓ Section 1: Data Structure Problems
- ✓ Section 2: Mathematical Problems
- ✓ Section 3: String Problems
- ✓ Section 4: Greedy Problems
- ✓ Section 5: Brute Force Problems





DO
MORE.