

[Pregledna plošča](#) / Moji predmeti / [aps2uni](#) / 8. april - 14. april / [Izziv 6 \(Strassen\)](#)

Začeto dne torek, 9. april 2019, 09:42

Stanje Zaključeno

Dokončano dne nedelja, 14. april 2019, 23:38

Porabljeni čas 5 dni 13 ure

Točke 1,00/1,00

Ocena **5,00** od možne ocene 5,00 (**100%**)

Vprašanje 1

Pravilno

Ocena 1,00 od
1,00

Napišite program za množenje matrik s Strassenovim algoritmom.

Da olajšamo implementacijo, naj vedno velja sledeče:

- vse vhodne matrike so kvadratne (dimenzij n krat n)
 - njihova dimenzija je potenca števila 2.

Oris Strassenovega algoritma

Vhodni matriki **a** in **b**, izhodna matrika **c**. Vsako matriko razdelimo na 4 podmatrike (npr. **a** razdelimo na **a₁₁**, **a₁₂**, **a₂₁**, **a₂₂**).

Izračunamo sedem podproduktov:

```

m1 = (a11+a22)(b11+b22)
m2 = (a21+a22)b11
m3 = a11(b12-b22)
m4 = a22(b21-b11)
m5 = (a11+a12)b22
m6 = (a21-a11)(b11+b12)
m7 = (a12-a22)(b21+b22)

```

Podmatrike končne matrike \mathbf{c} izračunamo na sledeći način:

$$\begin{aligned}c_{11} &= m_1 + m_4 - m_5 + m_7 \\c_{12} &= m_3 + m_5 \\c_{21} &= m_2 + m_4 \\c_{22} &= m_1 - m_2 + m_3 + m_6\end{aligned}$$

Vhod in izhod

Program naj na standardnem vhodu najprej prebere dimenzijo matrik n in mejno vrednost, pri kateri naj se rekurzija pri Strassenovem algoritmu ustavi (pri tej velikosti matrik naj se izvede klasično množenje matrik). Potem pa sledita dve matriki celih števil, vsaka dimenziji n kрат n .

Na izhod, za vsako matriko m_{-i} , izpišite vsoto vseh elementov v tej matriki. Te vsote izpišete takrat, ko imate na voljo vseh sedem produktivnih matrik m_{-i} .

Za konec pa izpišite še celoten končni rezultat.

For example:

| Input | Result |
|-------|---------|
| 2 1 | m1: 117 |
| 3 8 | m2: 120 |
| 9 6 | m3: 3 |
| 8 6 | m4: -18 |
| 5 5 | m5: 55 |
| | m6: 84 |
| | m7: 20 |
| | 64 58 |
| | 102 84 |

Answer: (penalty regime: 0 %)

[Reset answer](#)

```
1 import java.util.*;
2
3 public class Izziv6 {
4     protected static int dimenzijaMatrike;
5     protected static int meja;
6     private static Scanner sc = new Scanner(System.in);
7     private static int[][] matrikaA, matrikaB, matrikaC;
8
9     public static void main(String[] args) {
10         beri();
11         Strassen s = new Strassen(matrikaA, matrikaB, meja);
12         matrikaC = s.getMatrikaC();
13         izpis(matrikaC);
14     }
15
16     private static void beri() {
17         dimenzijaMatrike = sc.nextInt();
18         meja = sc.nextInt();
19         matrikaA = branjeMatrike();
20         matrikaB = branjeMatrike();
21     }
22 }
```

| | Input | Expected | Got | |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| ✓ | 2 1 3 8 9 6 8 6 5 5 | m1: 117 m2: 120 m3: 3 m4: -18 m5: 55 m6: 84 m7: 20 64 58 102 84 | m1: 117 m2: 120 m3: 3 m4: -18 m5: 55 m6: 84 m7: 20 64 58 102 84 | ✓ |
| ✓ | 8 2 6 3 5 1 7 3 6 0 9 0 8 6 3 4 9 6 9 7 3 1 6 6 0 6 2 9 8 8 3 3 8 6 1 8 3 3 4 2 3 6 4 2 8 5 2 3 1 6 1 1 3 9 0 2 5 1 8 3 5 5 7 1 0 2 3 7 2 6 9 4 0 2 1 9 2 7 5 5 6 2 5 4 4 3 2 7 4 6 8 7 9 1 3 2 5 5 4 6 8 4 9 5 1 5 7 6 1 8 5 8 6 2 6 4 1 9 9 3 6 9 3 1 4 0 7 6 5 9 | m1: 2642 m2: 1529 m3: -224 m4: 12 m5: 1484 m6: 326 m7: 407 m1: 1048 m2: 530 m3: -4 m4: 72 m5: 532 m6: -62 m7: 107 m1: -240 m2: -97 m3: 27 m4: -67 m5: -180 m6: -19 m7: 8 m1: 9 m2: 18 m3: 36 m4: -37 m5: -72 m6: -2 m7: -157 m1: 2113 m2: 1144 m3: -285 m4: -38 m5: 1117 m6: 215 m7: 27 m1: -40 m2: -255 m3: 49 m4: 15 m5: -44 m6: -439 m7: -125 m1: 827 m2: 510 m3: -30 m4: -87 m5: 303 m6: 88 m7: -149 m1: 5593 m2: 2277 m3: -571 m4: -143 m5: 3822 m6: -516 m7: 1359 139 180 112 179 214 153 104 148 227 221 165 209 285 214 173 254 141 223 131 185 251 208 131 151 218 257 185 215 259 224 225 257 116 166 118 133 179 152 139 156 147 153 133 108 161 165 125 164 138 124 108 92 109 85 110 125 133 188 152 125 194 147 86 132 | m1: 2642 m2: 1529 m3: -224 m4: 12 m5: 1484 m6: 326 m7: 407 m1: 1048 m2: 530 m3: -4 m4: 72 m5: 532 m6: -62 m7: 107 m1: -240 m2: -97 m3: 27 m4: -67 m5: -180 m6: -19 m7: 8 m1: 9 m2: 18 m3: 36 m4: -37 m5: -72 m6: -2 m7: -157 m1: 2113 m2: 1144 m3: -285 m4: -38 m5: 1117 m6: 215 m7: 27 m1: -40 m2: -255 m3: 49 m4: 15 m5: -44 m6: -439 m7: -125 m1: 827 m2: 510 m3: -30 m4: -87 m5: 303 m6: 88 m7: -149 m1: 5593 m2: 2277 m3: -571 m4: -143 m5: 3822 m6: -516 m7: 1359 139 180 112 179 214 153 104 148 227 221 165 209 285 214 173 254 141 223 131 185 251 208 131 151 218 257 185 215 259 224 225 257 116 166 118 133 179 152 139 156 147 153 133 108 161 165 125 164 138 124 108 92 109 85 110 125 133 188 152 125 194 147 86 132 | ✓ |

| | Input | Expected | Got | |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| ✓ | 16 8 0 2 3 9 2 5 9 8 9 0 7 8 6 4 5 4 8 0 0 0 2 6 3 0 6 5 0 1 8 1 1 8 9 0 1 0 6 3 8 9 4 4 0 5 4 6 7 1 8 9 8 8 7 6 3 7 9 5 8 4 4 4 7 4 0 9 2 1 8 9 4 5 7 6 7 7 2 4 7 0 6 0 1 6 0 0 3 2 3 1 1 2 1 9 5 2 8 3 9 8 9 8 1 6 7 5 4 1 8 5 2 5 1 1 1 1 8 5 0 6 7 7 3 5 8 1 6 8 5 0 2 0 9 7 4 8 2 3 9 0 6 8 0 5 5 6 0 9 1 7 6 7 0 9 3 1 6 9 7 2 9 7 1 7 5 6 4 7 1 3 5 2 5 7 6 8 3 1 0 6 1 5 1 1 3 7 4 6 6 3 9 5 6 8 9 7 8 7 0 5 8 9 0 0 8 5 3 6 4 5 0 1 3 4 1 0 3 6 1 8 6 7 3 8 5 3 7 3 6 0 2 4 2 9 2 7 8 2 8 0 2 5 8 8 9 9 9 5 4 3 4 9 5 5 2 3 1 0 0 1 7 6 4 2 6 5 0 4 8 5 8 6 2 1 0 5 2 4 5 0 7 3 3 1 1 9 0 0 8 3 0 6 8 7 5 6 1 7 7 8 5 7 1 1 2 8 3 5 9 9 8 9 8 9 6 0 2 7 7 8 8 7 1 3 3 7 3 3 7 0 3 5 4 6 3 7 5 2 3 8 0 7 1 2 6 8 8 5 7 3 3 7 8 3 1 4 0 9 8 4 4 2 0 5 4 0 3 9 3 1 0 0 3 7 4 4 9 1 9 6 0 9 1 3 2 8 8 7 2 4 3 8 8 6 4 8 1 0 6 0 9 9 4 7 5 8 2 8 2 0 0 4 1 0 8 8 8 2 6 1 6 7 3 7 3 5 7 9 9 3 9 9 5 4 1 6 3 3 6 7 5 7 4 2 4 9 7 2 6 0 0 7 8 8 8 2 7 9 3 1 1 3 4 6 6 0 9 0 6 9 0 3 0 4 4 0 1 1 5 8 8 5 8 9 4 6 0 3 9 4 3 7 4 0 4 8 1 7 3 6 8 4 0 6 7 1 4 9 8 8 8 5 | m1: 39587 m2: 18986 m3: 352 m4: 2561 m5: 21846 m6: 979 m7: -427 401 313 263 384 347 535 356 423 489 413 381 382 280 348 391 436 210 193 133 270 240 309 166 211 294 225 145 244 218 168 285 277 357 214 189 272 263 454 244 268 391 249 227 303 228 249 306 392 492 386 300 467 471 649 377 470 588 462 436 488 381 464 473 511 443 301 263 391 257 489 260 338 445 323 336 368 270 316 335 405 191 144 184 159 231 298 143 201 220 203 150 154 144 146 236 267 435 340 235 410 459 605 336 411 503 430 395 414 337 408 419 474 356 315 214 370 308 420 213 328 432 270 281 357 241 288 346 361 376 199 203 232 311 483 215 280 351 259 310 344 291 279 331 434 405 264 253 352 364 569 289 332 431 341 302 276 240 293 371 508 375 271 235 346 407 554 289 336 494 349 336 356 333 394 406 492 323 269 231 348 308 397 204 309 361 302 232 268 235 223 355 381 427 368 237 453 447 589 322 399 507 399 363 392 286 405 393 435 286 228 192 308 288 363 190 263 320 259 200 233 222 266 329 319 409 269 170 352 344 451 280 318 371 301 236 291 215 289 321 365 487 340 216 428 378 606 389 421 486 431 396 386 333 430 390 485 | m1: 39587 m2: 18986 m3: 352 m4: 2561 m5: 21846 m6: 979 m7: -427 401 313 263 384 347 535 356 423 489 413 381 382 280 348 391 436 210 193 133 270 240 309 166 211 294 225 145 244 218 168 285 277 357 214 189 272 263 454 244 268 391 249 227 303 228 249 306 392 492 386 300 467 471 649 377 470 588 462 436 488 381 464 473 511 443 301 263 391 257 489 260 338 445 323 336 368 270 316 335 405 191 144 184 159 231 298 143 201 201 203 150 154 144 146 236 267 435 340 235 410 459 605 336 411 503 430 395 414 337 408 419 474 356 315 214 370 308 420 213 328 432 270 281 357 241 288 346 361 376 199 203 232 311 483 215 280 351 259 310 344 291 279 331 434 405 264 253 352 364 569 289 332 431 341 302 276 240 293 371 508 375 271 235 346 407 554 289 336 494 349 336 356 333 394 406 492 323 269 231 348 308 397 204 309 361 302 232 268 235 223 355 381 427 368 237 453 447 589 322 399 507 399 363 392 286 405 393 435 286 228 192 308 288 363 190 263 320 259 200 233 222 266 329 319 409 269 170 352 344 451 280 318 371 301 236 291 215 289 321 365 487 340 216 428 378 606 389 421 486 431 396 386 333 430 390 485 | ✓ |
| ✓ | 16 4 4 1 3 5 5 8 7 7 2 0 2 8 8 3 9 8 2 3 4 6 3 7 7 9 3 7 2 8 8 7 7 1 2 4 1 4 1 9 7 2 3 2 0 4 8 1 8 1 5 6 2 6 2 5 5 1 1 0 7 1 1 7 0 1 5 9 0 8 0 4 4 4 8 4 0 8 4 2 7 6 | m1: 21447 m2: 9630 m3: -1089 m4: 171 m5: 12829 m6: -408 m7: 2356 m1: 13188 m2: 4653 m3: -1745 m4: -84 | m1: 21447 m2: 9630 m3: -1089 m4: 171 m5: 12829 m6: -408 m7: 2356 m1: 13188 m2: 4653 m3: -1745 m4: -84 | ✓ |

| Input | Expected | Got |
|-----------------|---------------------------------|-------------------------------------|
| 6 4 8 5 6 5 8 8 | m5: 8151 | m5: 8151 |
| 0 4 3 5 3 3 0 9 | m6: -1425 | m6: -1425 |
| 7 5 0 9 1 1 4 9 | m7: 699 | m7: 699 |
| 3 3 8 7 2 1 4 4 | m1: 92 | m1: 92 |
| 7 3 2 7 0 6 3 6 | m2: 149 | m2: 149 |
| 5 3 5 1 2 1 8 5 | m3: -415 | m3: -415 |
| 1 1 8 8 0 4 4 6 | m4: -251 | m4: -251 |
| 5 3 9 7 8 3 9 6 | m5: 125 | m5: 125 |
| 9 9 4 0 3 3 4 3 | m6: -221 | m6: -221 |
| 8 9 3 9 1 1 3 4 | m7: 15 | m7: 15 |
| 4 9 8 9 7 6 8 4 | m1: -1837 | m1: -1837 |
| 5 3 8 4 8 0 2 5 | m2: 81 | m2: 81 |
| 5 2 5 4 4 0 6 5 | m3: 951 | m3: 951 |
| 8 4 8 6 9 6 7 3 | m4: 292 | m4: 292 |
| 1 3 2 5 6 8 0 2 | m5: -2043 | m5: -2043 |
| 0 8 0 7 6 8 1 2 | m6: -15 | m6: -15 |
| 1 9 3 5 2 4 7 6 | m7: -39 | m7: -39 |
| 8 1 7 2 1 3 4 0 | m1: 8010 | m1: 8010 |
| 9 8 5 2 6 3 4 1 | m2: 4843 | m2: 4843 |
| 3 5 3 1 6 7 6 7 | m3: 204 | m3: 204 |
| 6 5 1 9 9 1 0 4 | m4: 92 | m4: 92 |
| 6 1 6 6 1 0 5 6 | m5: 4131 | m5: 4131 |
| 4 5 7 5 7 7 1 1 | m6: 1516 | m6: 1516 |
| 5 1 9 3 2 4 0 4 | m7: 1116 | m7: 1116 |
| 2 4 2 9 5 8 9 0 | m1: 1601 | m1: 1601 |
| 7 3 4 2 4 1 2 2 | m2: -609 | m2: -609 |
| 1 3 7 5 4 2 2 4 | m3: -221 | m3: -221 |
| 6 7 1 1 8 6 3 8 | m4: -54 | m4: -54 |
| 3 8 2 3 0 2 4 7 | m5: 418 | m5: 418 |
| 9 5 2 6 0 1 1 2 | m6: -2494 | m6: -2494 |
| 2 8 2 7 7 7 9 5 | m7: -761 | m7: -761 |
| 6 2 1 3 1 0 1 6 | m1: -2888 | m1: -2888 |
| 9 2 4 0 5 4 8 6 | m2: 320 | m2: 320 |
| 6 4 7 0 1 7 6 2 | m3: 12 | m3: 12 |
| 8 0 2 4 7 6 6 7 | m4: -403 | m4: -403 |
| 6 1 2 4 5 4 5 4 | m5: -1548 | m5: -1548 |
| 9 5 2 4 8 6 4 4 | m6: 3354 | m6: 3354 |
| 7 0 4 4 2 6 6 3 | m7: 375 | m7: 375 |
| 2 5 4 8 3 0 6 0 | m1: 43006 | m1: 43006 |
| 0 2 3 7 3 2 8 3 | m2: 21992 | m2: 21992 |
| 0 0 5 4 7 1 1 7 | m3: -1354 | m3: -1354 |
| 2 5 9 2 6 3 9 8 | m4: -1242 | m4: -1242 |
| 1 5 6 8 4 2 3 0 | m5: 19244 | m5: 19244 |
| 5 2 5 0 4 7 8 1 | m6: -603 | m6: -603 |
| 7 9 5 4 3 9 2 4 | m7: -2829 | m7: -2829 |
| 3 3 8 9 2 4 1 7 | 424 422 372 322 333 404 325 343 | 424 422 372 322 333 404 325 343 499 |
| 6 9 3 8 5 1 7 9 | 499 254 378 295 335 387 238 267 | 254 378 295 335 387 238 267 |
| 9 8 7 3 9 9 1 3 | 407 434 362 395 380 388 333 384 | 407 434 362 395 380 388 333 384 510 |
| 3 8 7 9 1 4 0 1 | 510 300 399 307 316 386 306 296 | 300 399 307 316 386 306 296 |
| 7 4 4 2 0 5 0 0 | 307 278 238 236 255 278 280 278 | 307 278 238 236 255 278 280 278 367 |
| 4 6 8 1 3 9 1 3 | 367 215 271 207 243 268 204 171 | 215 271 207 243 268 204 171 |
| 9 4 2 5 7 4 4 0 | 197 250 220 285 201 224 216 155 | 197 250 220 285 201 224 216 155 312 |
| 4 2 8 1 0 3 1 1 | 312 152 222 130 135 210 154 129 | 152 222 130 135 210 154 129 |
| 4 1 7 2 9 6 1 4 | 320 371 323 337 279 356 299 254 | 320 371 323 337 279 356 299 254 405 |
| | 405 226 365 312 281 275 240 238 | 226 365 312 281 275 240 238 |
| | 349 337 345 347 354 355 305 308 | 349 337 345 347 354 355 305 308 443 |
| | 443 225 364 232 313 345 238 323 | 225 364 232 313 345 238 323 |
| | 299 358 296 327 292 332 246 229 | 299 358 296 327 292 332 246 229 394 |
| | 394 175 339 266 229 281 244 219 | 175 339 266 229 281 244 219 |
| | 278 294 312 263 265 284 233 218 | 278 294 312 263 265 284 233 218 378 |
| | 378 187 307 215 249 283 253 183 | 187 307 215 249 283 253 183 |
| | 345 430 406 376 303 326 283 322 | 345 430 406 376 303 326 283 322 492 |
| | 492 302 368 292 378 410 310 273 | 302 368 292 378 410 310 273 |
| | 269 317 347 379 353 358 283 220 | 269 317 347 379 353 358 283 220 332 |
| | 332 208 402 269 292 274 284 316 | 208 402 269 292 274 284 316 |
| | 359 435 365 468 398 375 440 362 | 359 435 365 468 398 375 440 362 534 |
| | 534 308 388 282 373 381 314 333 | 308 388 282 373 381 314 333 |
| | 320 448 391 456 349 342 302 298 | 320 448 391 456 349 342 302 298 464 |
| | 464 277 372 302 351 375 297 280 | 277 372 302 351 375 297 280 |
| | 250 328 258 290 246 255 245 281 | 250 328 258 290 246 255 245 281 345 |
| | 345 240 321 189 189 254 174 233 | 240 321 189 189 254 174 233 |
| | 258 294 247 353 280 285 309 194 | 258 294 247 353 280 285 309 194 360 |
| | 360 178 237 217 214 244 277 178 | 178 237 217 214 244 277 178 |
| | 268 366 383 406 330 354 294 248 | 268 366 383 406 330 354 294 248 447 |
| | 447 253 369 214 333 320 214 262 | 253 369 214 333 320 214 262 |
| | 235 384 293 329 258 324 279 201 | 235 384 293 329 258 324 279 201 368 |
| | 368 176 289 264 216 221 199 229 | 176 289 264 216 221 199 229 |

| ✓ | Input 32 8 5 2 5 6 7 4 3 7 | Expected m1: 156381 m2: 83794 | Got m1: 156381 m2: 83794 | ✓ |
|---|----------------------------------|-------------------------------------|---------------------------------|---|
| | 7 8 8 7 6 9 4 7 | m3: 488 | m3: 488 | |
| | 2 2 7 7 4 8 3 2 | m4: -1785 | m4: -1785 | |
| | 6 3 8 7 8 7 9 2 | m5: 80775 | m5: 80775 | |
| | 4 1 8 5 5 0 6 2 | m6: 11839 | m6: 11839 | |
| | 9 7 4 4 0 1 4 7 | m7: 6364 | m7: 6364 | |
| | 2 8 7 0 6 2 6 6 | m1: 80081 | m1: 80081 | |
| | 8 5 3 7 3 7 9 9 | m2: 44075 | m2: 44075 | |
| | 8 8 2 0 5 8 8 7 | m3: 2170 | m3: 2170 | |
| | 7 5 9 0 7 2 7 5 | m4: -2561 | m4: -2561 | |
| | 1 2 7 2 7 9 0 3 | m5: 37104 | m5: 37104 | |
| | 2 9 6 6 6 3 7 3 | m6: 3672 | m6: 3672 | |
| | 3 8 4 2 1 7 8 0 | m7: -922 | m7: -922 | |
| | 7 1 4 4 9 7 5 4 | m1: 145 | m1: 145 | |
| | 7 2 6 9 8 2 1 2 | m2: 3080 | m2: 3080 | |
| | 7 5 9 3 2 5 6 8 | m3: 1804 | m3: 1804 | |
| | 5 3 8 0 0 7 0 7 | m4: -1280 | m4: -1280 | |
| | 4 2 3 4 6 8 9 3 | m5: -2667 | m5: -2667 | |
| | 0 2 2 0 6 2 9 7 | m6: 702 | m6: 702 | |
| | 5 6 0 0 6 3 4 7 | m7: 479 | m7: 479 | |
| | 9 1 5 4 7 3 8 7 | m1: 3339 | m1: 3339 | |
| | 2 7 3 8 6 2 1 2 | m2: -372 | m2: -372 | |
| | 0 4 7 5 8 5 8 2 | m3: -524 | m3: -524 | |
| | 9 5 3 0 3 0 2 5 | m4: 1269 | m4: 1269 | |
| | 9 3 0 3 5 0 7 3 | m5: 3167 | m5: 3167 | |
| | 6 6 2 9 9 5 3 9 | m6: -801 | m6: -801 | |
| | 7 0 0 5 9 3 2 3 | m7: -159 | m7: -159 | |
| | 9 5 7 1 0 3 0 1 | m1: 76358 | m1: 76358 | |
| | 6 5 0 4 3 3 1 2 | m2: 38282 | m2: 38282 | |
| | 6 6 2 4 0 2 1 8 | m3: -1371 | m3: -1371 | |
| | 6 6 6 6 5 9 2 1 | m4: 1342 | m4: 1342 | |
| | 8 0 0 4 4 8 5 7 | m5: 44339 | m5: 44339 | |
| | 2 1 0 8 4 8 7 7 | m6: 4353 | m6: 4353 | |
| | 7 3 2 6 5 7 5 9 | m7: 7411 | m7: 7411 | |
| | 6 1 9 5 5 1 6 8 | m1: 8350 | m1: 8350 | |
| | 8 1 7 0 3 3 3 1 | m2: 2563 | m2: 2563 | |
| | 9 3 7 7 1 3 5 8 | m3: 380 | m3: 380 | |
| | 4 7 2 7 0 9 0 7 | m4: -767 | m4: -767 | |
| | 9 5 1 2 9 6 4 0 | m5: -601 | m5: -601 | |
| | 1 0 2 5 2 4 0 8 | m6: -5009 | m6: -5009 | |
| | 6 9 3 5 7 7 1 9 | m7: -8551 | m7: -8551 | |
| | 5 8 4 2 4 4 1 7 | m1: -8889 | m1: -8889 | |
| | 0 7 1 3 9 2 3 8 | m2: -5295 | m2: -5295 | |
| | 4 4 2 4 0 9 3 4 | m3: 517 | m3: 517 | |
| | 8 9 8 6 8 3 8 1 | m4: 2017 | m4: 2017 | |
| | 9 5 7 3 7 2 4 6 | m5: 1075 | m5: 1075 | |
| | 6 4 1 5 3 1 2 3 | m6: -1824 | m6: -1824 | |
| | 0 8 6 1 3 3 3 7 | m7: 8373 | m7: 8373 | |
| | 1 3 3 6 9 1 7 5 | m1: 328371 | m1: 328371 | |
| | 5 9 1 4 6 2 6 4 | m2: 162130 | m2: 162130 | |
| | 9 6 5 9 4 7 5 3 | m3: 2519 | m3: 2519 | |
| | 7 3 7 9 0 6 0 7 | m4: 7208 | m4: 7208 | |
| | 1 1 4 6 3 8 0 4 | m5: 164422 | m5: 164422 | |
| | 1 7 0 4 1 0 5 5 | m6: 2366 | m6: 2366 | |
| | 1 9 6 1 5 2 5 5 | m7: -6161 | m7: -6161 | |
| | 4 1 3 6 2 8 8 1 | 776 920 817 829 758 607 807 672 | 776 920 817 829 758 607 807 672 | |
| | 8 0 4 8 6 8 0 6 | 682 810 928 743 880 699 787 783 | 810 928 743 880 699 787 783 | |
| | 5 1 3 3 2 0 5 7 | 784 789 880 921 588 618 832 954 | 880 921 588 618 832 954 | |
| | 3 8 4 1 7 6 2 0 | 880 788 781 786 907 675 660 771 | 786 907 675 660 771 | |
| | 3 2 1 7 0 6 6 2 | 622 811 746 728 719 563 642 607 | 622 811 746 728 719 563 642 607 | |
| | 4 8 1 3 4 6 0 7 | 610 753 798 711 742 752 778 620 | 753 798 711 742 752 778 620 | |
| | 7 7 3 3 6 8 1 5 | 713 689 863 737 542 598 623 768 | 863 737 542 598 623 768 881 739 | |
| | 8 6 7 9 7 4 8 9 | 881 739 719 760 837 522 631 582 | 760 837 522 631 582 | |
| | 1 5 5 5 5 4 0 7 | 655 775 835 647 640 632 654 592 | 655 775 835 647 640 632 654 592 | |
| | 2 9 5 4 3 0 6 4 | 614 735 781 755 670 738 679 668 | 735 781 755 670 738 679 668 | |
| | 4 2 0 2 1 0 2 7 | 689 689 835 902 579 513 810 866 | 835 902 579 513 810 866 | |
| | 4 5 5 5 2 6 9 2 | 762 725 739 792 822 490 617 701 | 792 822 490 617 701 | |
| | 9 1 8 8 3 5 9 0 | 678 744 785 747 730 569 631 574 | 678 744 785 747 730 569 631 574 | |
| | 9 5 9 4 9 9 6 4 | 554 692 815 590 723 701 776 677 | 692 815 590 723 701 776 677 | |
| | 6 4 3 5 6 3 8 4 | 741 734 806 830 592 471 811 790 | 720 831 577 638 693 | |
| | 8 2 6 6 5 9 6 3 | 788 702 665 720 831 577 638 693 | 539 631 673 560 614 401 511 527 | |
| | 4 4 7 9 9 0 1 | 539 631 673 560 614 401 511 527 | 540 665 621 668 515 585 569 | |
| | 3 0 1 2 8 6 5 5 | 489 540 665 621 668 515 585 569 | 671 434 394 593 741 681 616 555 | |
| | 3 3 8 2 4 2 8 6 | 620 615 737 671 434 394 593 741 | 632 695 375 539 514 | |
| | 4 8 7 0 7 8 2 2 | 681 616 555 632 695 375 539 514 | 666 757 724 674 661 478 607 487 | |
| | 2 7 1 1 2 5 6 9 | 666 757 724 674 661 478 607 487 | 643 892 565 568 702 622 590 670 | |
| | 2 1 0 6 9 0 7 4 | 548 643 892 565 568 702 622 590 | 643 892 565 568 702 622 590 670 | |
| | 6 8 4 5 4 7 1 8 | 670 615 799 738 482 475 602 688 | 799 738 482 475 602 688 707 565 | |

| Input | Expected | Got |
|-----------------|---------------------------------|-------------------------------------|
| 1 0 4 0 2 7 5 3 | 707 565 669 595 763 550 569 565 | 595 763 550 569 565 |
| 0 1 6 3 4 3 2 4 | 588 690 664 633 581 450 619 462 | 588 690 664 633 581 450 619 462 575 |
| 8 2 8 8 1 0 7 2 | 575 559 776 507 590 542 612 534 | 559 776 507 590 542 612 534 635 593 |
| 4 6 9 4 4 1 9 0 | 635 593 665 690 500 433 639 703 | 665 690 500 433 639 703 645 564 568 |
| 1 5 1 3 9 5 7 0 | 645 564 568 535 755 568 551 501 | 535 755 568 551 501 |
| 1 0 4 5 2 6 3 7 | 534 669 562 597 547 423 581 499 | 534 669 562 597 547 423 581 499 576 |
| 3 2 2 2 8 9 1 8 | 576 603 690 583 623 576 610 548 | 603 690 583 623 576 610 548 587 514 |
| 7 0 7 6 2 5 2 5 | 587 514 663 603 486 420 568 653 | 663 603 486 420 568 653 640 616 564 |
| 3 5 9 5 5 8 7 1 | 640 616 564 568 688 520 554 497 | 568 688 520 554 497 |
| 5 6 3 9 9 8 5 5 | 659 794 756 659 674 510 609 566 | 659 794 756 659 674 510 609 566 554 |
| 5 6 2 5 3 9 4 3 | 554 640 847 605 750 612 674 580 | 640 847 605 750 612 674 580 741 616 |
| 8 8 6 8 3 6 5 7 | 741 616 754 808 484 448 673 726 | 754 808 484 448 673 726 841 685 539 |
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| 9 0 0 3 6 9 3 4 | 741 595 530 567 680 514 555 602 | 567 680 514 555 602 |
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| 9 7 5 5 9 7 4 1 | 583 733 668 717 684 504 659 639 | 583 733 668 717 684 504 659 639 594 |
| 3 8 8 7 5 1 9 0 | 594 681 736 657 768 643 709 631 | 681 736 657 768 643 709 631 739 649 |
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| 1 6 7 5 4 6 3 5 | 746 671 596 594 789 518 620 592 | 594 789 518 620 592 |
| 9 1 6 4 4 6 2 2 | 648 864 816 644 631 580 590 588 | 648 864 816 644 631 580 590 588 625 |
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| Input | Expected | Got |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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| | Input | Expected | Got | |
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| Input | Expected | Got |
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| 3 2 9 9 5 0 9 9 | m7: 7839 | m7: 7839 |
| 7 1 3 2 5 2 3 0 | m1: 9130 | m1: 9130 |
| 9 6 2 1 5 6 3 2 | m2: 4185 | m2: 4185 |
| 7 6 6 8 3 6 0 1 | m3: 415 | m3: 415 |
| 3 1 6 5 7 7 8 2 | m4: 581 | m4: 581 |
| 6 4 5 9 1 6 6 8 | m5: 3312 | m5: 3312 |
| 7 8 2 6 2 3 9 7 | m6: -1860 | m6: -1860 |
| 2 9 7 3 4 0 0 5 | m7: -1736 | m7: -1736 |
| 5 0 2 7 3 3 4 0 | m1: 4650 | m1: 4650 |
| 5 3 2 0 6 5 4 5 | m2: 3360 | m2: 3360 |
| 2 1 0 6 7 7 1 4 | m3: 414 | m3: 414 |
| 4 1 0 7 5 2 3 4 | m4: -729 | m4: -729 |
| 1 9 4 7 1 0 6 2 | m5: 1099 | m5: 1099 |
| 8 6 7 8 9 1 1 9 | m6: -370 | m6: -370 |
| 7 7 3 6 7 8 9 4 | m7: 154 | m7: 154 |
| 9 7 4 2 1 0 4 1 | m1: 968 | m1: 968 |
| 6 0 5 5 7 9 7 9 | m2: 520 | m2: 520 |
| 4 1 1 8 6 1 5 5 | m3: 230 | m3: 230 |
| 7 6 0 9 1 4 7 2 | m4: -210 | m4: -210 |
| 5 6 9 1 6 5 0 4 | m5: 195 | m5: 195 |
| 2 5 4 3 2 4 5 5 | m6: -368 | m6: -368 |
| 9 9 9 8 8 6 7 7 | m7: -138 | m7: -138 |
| 8 8 5 7 2 1 0 8 | m1: -390 | m1: -390 |
| 6 3 0 7 1 5 1 4 | m2: -560 | m2: -560 |
| 5 6 7 9 0 3 7 7 | m3: 185 | m3: 185 |
| 2 0 3 0 9 7 8 3 | m4: 205 | m4: 205 |
| 4 9 8 2 0 2 1 8 | m5: 219 | m5: 219 |
| 6 3 0 5 1 7 3 9 | m6: 0 | m6: 0 |
| 3 1 5 8 4 1 6 2 | m7: 0 | m7: 0 |
| 6 6 5 6 2 0 5 2 | m1: 3936 | m1: 3936 |
| 6 3 6 6 3 9 5 4 | m2: 959 | m2: 959 |
| 9 2 9 4 8 1 4 1 | m3: -89 | m3: -89 |
| 1 3 2 9 3 4 6 1 | m4: 1200 | m4: 1200 |
| 4 5 6 7 5 1 6 0 | m5: 2499 | m5: 2499 |
| 7 6 9 5 7 1 5 7 | m6: -621 | m6: -621 |
| 0 8 9 6 2 0 4 3 | m7: -680 | m7: -680 |
| 2 6 2 1 0 9 5 4 | m1: -1056 | m1: -1056 |
| 3 5 7 2 1 3 3 1 | m2: 195 | m2: 195 |
| 6 0 5 7 8 7 7 9 | m3: -140 | m3: -140 |
| 4 0 7 0 7 7 3 1 | m4: -4 | m4: -4 |
| 1 7 4 0 5 7 0 7 | m5: 513 | m5: 513 |
| 1 0 8 6 7 2 4 0 | m6: 1596 | m6: 1596 |
| 7 2 3 7 4 0 7 3 | m7: 2380 | m7: 2380 |
| 5 6 7 9 6 6 6 0 | m1: -100 | m1: -100 |
| 4 1 6 4 5 2 7 1 | m2: 46 | m2: 46 |
| 7 7 0 9 6 5 1 8 | m3: 60 | m3: 60 |
| 2 0 6 8 0 7 7 4 | m4: -96 | m4: -96 |
| 6 1 0 7 6 4 8 9 | m5: 243 | m5: 243 |
| 5 3 3 6 4 4 2 7 | m6: 240 | m6: 240 |
| 8 8 7 8 4 4 4 3 | m7: 682 | m7: 682 |
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| 4 9 4 4 6 4 6 9 | m3: 1470 | m3: 1470 |
| 0 6 2 0 2 5 1 1 | m4: 0 | m4: 0 |
| 1 9 5 9 8 0 3 6 | m5: 8793 | m5: 8793 |
| 3 6 0 5 4 3 6 9 | m6: 1576 | m6: 1576 |
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| 2 7 4 3 2 4 5 1 | m3: -300 | m3: -300 |
| 1 8 9 5 7 4 5 0 | m4: 1125 | m4: 1125 |
| 9 1 7 2 6 1 8 8 | m5: 260 | m5: 260 |
| 5 3 9 6 0 9 8 2 | m6: -270 | m6: -270 |
| 3 5 4 8 1 8 2 8 | m7: -460 | m7: -460 |
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| 3 6 8 6 9 8 6 2 | m2: -936 | m2: -936 |
| 4 4 0 4 6 2 3 4 | m3: -120 | m3: -120 |
| 6 9 3 5 2 0 5 1 | m4: 1012 | m4: 1012 |
| 1 6 7 1 9 4 2 8 | m5: 0 | m5: 0 |
| 9 9 8 6 4 3 0 0 | m6: -64 | m6: -64 |
| 1 5 7 9 8 5 0 8 | m7: -143 | m7: -143 |
| 9 6 8 1 2 2 6 2 | m1: 400 | m1: 400 |
| 4 5 5 2 9 1 9 0 | m2: 49 | m2: 49 |
| 7 0 3 9 3 8 5 8 | m3: -90 | m3: -90 |

| Input | Expected | Got | |
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| 3 8 8 3 5 8 2 3 | m5: 315 | m5: 315 | |
| 7 3 7 4 2 0 7 4 | m6: 45 | m6: 45 | |
| 7 4 4 3 4 0 0 8 | m7: -5 | m7: -5 | |
| 2 6 9 7 2 7 3 2 | m1: -805 | m1: -805 | |
| 3 2 2 4 8 1 2 0 | m2: -352 | m2: -352 | |
| 5 2 8 9 3 4 7 7 | m3: 216 | m3: 216 | |
| 3 2 8 1 1 4 2 4 | m4: -161 | m4: -161 | |
| 8 2 6 3 3 6 6 3 | m5: -255 | m5: -255 | |
| 6 0 0 0 0 6 7 5 | m6: -45 | m6: -45 | |
| 9 5 8 2 9 4 9 2 | m7: 540 | m7: 540 | |
| 0 5 9 0 2 0 2 4 | m1: 504 | m1: 504 | |
| 4 4 7 5 8 0 9 9 | m2: 184 | m2: 184 | |
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| 9 2 0 8 1 8 0 7 | m4: 84 | m4: 84 | |
| 7 0 4 2 2 0 6 5 | m5: 395 | m5: 395 | |
| 5 4 3 5 5 3 0 0 | m6: 20 | m6: 20 | |
| 8 7 4 5 4 2 4 5 | m7: 63 | m7: 63 | |
| 5 7 9 3 8 4 4 7 | m1: -5 | m1: -5 | |
| 7 0 5 9 7 7 9 7 | m2: 135 | m2: 135 | |
| 6 5 8 9 3 3 8 3 | m3: 0 | m3: 0 | |
| 4 7 7 1 8 2 6 1 | m4: -16 | m4: -16 | |
| 4 3 3 8 3 9 1 5 | m5: 126 | m5: 126 | |
| 7 7 1 9 5 1 3 6 | m6: 140 | m6: 140 | |
| 7 8 5 4 1 7 6 2 | m7: 210 | m7: 210 | |
| 6 4 9 3 1 7 2 6 | m1: 84 | m1: 84 | |
| 1 8 3 8 5 1 5 2 | m2: 18 | m2: 18 | |
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| 2 7 3 8 3 8 0 5 | m4: -54 | m4: -54 | |
| 1 5 0 5 3 9 9 5 | m5: -270 | m5: -270 | |
| 5 8 3 6 1 8 2 8 | m6: -40 | m6: -40 | |
| 8 0 4 3 2 4 5 0 | m7: -300 | m7: -300 | |
| 0 1 2 5 3 9 3 8 | m1: 170 | m1: 170 | |
| 4 0 0 5 6 3 5 6 | m2: -199 | m2: -199 | |
| 8 4 3 8 7 7 9 1 | m3: 264 | m3: 264 | |
| 5 9 4 4 0 3 9 5 | m4: -1005 | m4: -1005 | |
| 2 0 5 9 1 6 9 9 | m5: 899 | m5: 899 | |
| 5 0 4 1 8 3 1 8 | m6: 308 | m6: 308 | |
| 6 9 8 8 6 5 6 7 | m7: -280 | m7: -280 | |
| 0 9 1 1 9 3 8 0 | m1: 2449 | m1: 2449 | |
| 1 8 1 0 6 8 5 3 | m2: 455 | m2: 455 | |
| 1 5 0 5 2 8 2 3 | m3: -432 | m3: -432 | |
| 0 6 0 8 6 5 2 4 | m4: -774 | m4: -774 | |
| 6 8 0 4 4 0 5 0 | m5: 1416 | m5: 1416 | |
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| 1 2 9 1 1 4 9 9 | m7: -260 | m7: -260 | |
| 9 2 2 9 8 6 2 8 | m1: 832 | m1: 832 | |
| 7 4 6 5 3 3 5 6 | m2: -252 | m2: -252 | |
| 5 5 6 4 7 9 6 4 | m3: -350 | m3: -350 | |
| 6 3 2 4 5 9 6 3 | m4: 156 | m4: 156 | |
| 9 1 8 3 2 7 0 6 | m5: 1071 | m5: 1071 | |
| 3 5 5 0 5 6 9 6 | m6: 1 | m6: 1 | |
| 0 5 9 7 8 3 3 9 | m7: -17 | m7: -17 | |
| 1 5 1 1 0 9 2 1 | m1: -517 | m1: -517 | |
| 4 2 6 7 1 2 3 1 | m2: -444 | m2: -444 | |
| 9 2 7 3 7 6 6 0 | m3: -504 | m3: -504 | |
| 4 1 2 2 0 2 5 1 | m4: 506 | m4: 506 | |
| 0 4 1 7 9 6 3 2 | m5: 35 | m5: 35 | |
| 3 8 6 2 0 5 7 5 | m6: 320 | m6: 320 | |
| 2 8 0 3 7 7 7 0 | m7: -132 | m7: -132 | |
| 4 2 8 6 2 9 2 9 | m1: -288 | m1: -288 | |
| 0 5 1 5 9 7 7 9 | m2: -84 | m2: -84 | |
| 7 1 3 6 7 4 2 3 | m3: 120 | m3: 120 | |
| 7 0 7 5 6 0 9 1 | m4: 0 | m4: 0 | |
| 5 4 9 1 7 0 3 0 | m5: -144 | m5: -144 | |
| 2 3 9 0 8 8 2 3 | m6: -4 | m6: -4 | |
| 9 7 6 9 0 7 5 6 | m7: 72 | m7: 72 | |
| 5 4 5 2 4 3 2 9 | m1: 1476 | m1: 1476 | |
| 4 4 7 8 5 1 8 9 | m2: 847 | m2: 847 | |
| 4 0 6 8 1 9 9 8 | m3: 90 | m3: 90 | |
| 4 0 4 7 9 8 2 7 | m4: -814 | m4: -814 | |
| 8 2 0 8 9 3 0 1 | m5: 546 | m5: 546 | |
| 1 4 7 0 0 0 2 2 | m6: -100 | m6: -100 | |
| 3 0 4 2 0 3 6 7 | m7: 16 | m7: 16 | |
| 3 6 0 1 0 3 5 3 | m1: -300 | m1: -300 | |
| 4 0 4 4 2 1 3 9 | m2: 10 | m2: 10 | |
| 2 3 6 4 8 0 7 9 | m3: 363 | m3: 363 | |

| Input | Expected | Got |
|-----------------|-----------|-----------|
| 8 5 3 1 3 3 7 8 | m4: -16 | m4: -16 |
| 0 2 2 2 1 2 1 1 | m5: 100 | m5: 100 |
| 7 5 2 6 8 7 1 6 | m6: -169 | m6: -169 |
| 8 6 2 7 5 6 1 1 | m7: 456 | m7: 456 |
| 0 3 3 0 4 4 7 4 | m1: 66 | m1: 66 |
| 9 5 3 4 5 8 2 3 | m2: 48 | m2: 48 |
| 8 0 7 8 5 8 0 2 | m3: -18 | m3: -18 |
| 3 4 6 7 0 1 2 3 | m4: 108 | m4: 108 |
| 0 7 5 8 8 4 8 0 | m5: 342 | m5: 342 |
| 1 7 8 9 0 5 4 1 | m6: 180 | m6: 180 |
| 1 3 6 2 2 5 8 8 | m7: 64 | m7: 64 |
| 9 5 9 4 6 8 1 6 | m1: 1960 | m1: 1960 |
| 8 4 5 1 8 5 4 9 | m2: 1260 | m2: 1260 |
| 0 7 6 6 6 2 1 2 | m3: -842 | m3: -842 |
| 6 1 0 7 6 9 7 2 | m4: -268 | m4: -268 |
| 3 4 9 4 1 9 3 2 | m5: 1420 | m5: 1420 |
| 5 8 0 1 5 9 9 2 | m6: 381 | m6: 381 |
| 6 5 8 2 2 6 7 0 | m7: 556 | m7: 556 |
| 2 5 0 8 6 3 7 0 | m1: 9768 | m1: 9768 |
| 6 3 2 8 8 4 1 9 | m2: 5883 | m2: 5883 |
| 1 7 8 3 6 6 2 5 | m3: -56 | m3: -56 |
| 4 5 8 6 3 2 0 2 | m4: -760 | m4: -760 |
| 9 6 3 5 1 0 2 2 | m5: 4107 | m5: 4107 |
| 7 6 2 1 3 5 9 5 | m6: 1971 | m6: 1971 |
| 2 6 4 1 1 8 7 6 | m7: -1344 | m7: -1344 |
| 4 5 2 2 6 1 3 0 | m1: 5330 | m1: 5330 |
| 4 1 9 5 3 4 5 6 | m2: 2584 | m2: 2584 |
| 1 1 4 3 7 7 5 2 | m3: 60 | m3: 60 |
| 3 3 6 8 3 9 6 1 | m4: -560 | m4: -560 |
| 8 4 2 5 3 4 8 3 | m5: 2948 | m5: 2948 |
| 4 8 1 7 0 5 7 3 | m6: 252 | m6: 252 |
| 9 3 7 3 0 8 7 3 | m7: 132 | m7: 132 |
| 1 5 6 8 3 3 3 0 | m1: -616 | m1: -616 |
| 2 7 7 7 7 2 8 7 | m2: -178 | m2: -178 |
| 7 2 5 9 6 2 1 1 | m3: 160 | m3: 160 |
| 9 2 8 3 0 5 3 7 | m4: 45 | m4: 45 |
| 2 0 9 2 9 3 6 1 | m5: -366 | m5: -366 |
| 3 2 8 7 5 8 8 5 | m6: -36 | m6: -36 |
| 0 4 6 0 4 3 8 6 | m7: 112 | m7: 112 |
| 9 0 2 8 8 5 7 7 | m1: 385 | m1: 385 |
| 9 9 9 7 4 6 2 4 | m2: 420 | m2: 420 |
| 4 8 6 6 8 7 6 3 | m3: -24 | m3: -24 |
| 7 7 8 9 8 5 1 4 | m4: 93 | m4: 93 |
| 7 4 5 9 3 5 7 5 | m5: 50 | m5: 50 |
| 0 6 1 8 1 4 3 8 | m6: 90 | m6: 90 |
| 3 6 2 0 6 5 0 1 | m7: -50 | m7: -50 |
| 2 9 6 8 9 8 8 7 | m1: 4983 | m1: 4983 |
| 6 2 3 6 1 1 7 5 | m2: 3240 | m2: 3240 |
| 6 4 6 0 8 5 7 3 | m3: -124 | m3: -124 |
| 5 3 7 4 8 6 9 0 | m4: -178 | m4: -178 |
| 1 4 0 9 6 2 2 1 | m5: 2205 | m5: 2205 |
| | m6: 899 | m6: 899 |
| | m7: -124 | m7: -124 |
| | m1: -132 | m1: -132 |
| | m2: -805 | m2: -805 |
| | m3: 16 | m3: 16 |
| | m4: 54 | m4: 54 |
| | m5: 713 | m5: 713 |
| | m6: -1470 | m6: -1470 |
| | m7: 1425 | m7: 1425 |
| | m1: 1539 | m1: 1539 |
| | m2: 903 | m2: 903 |
| | m3: -12 | m3: -12 |
| | m4: -91 | m4: -91 |
| | m5: 1368 | m5: 1368 |
| | m6: 158 | m6: 158 |
| | m7: 1258 | m7: 1258 |
| | m1: 18531 | m1: 18531 |
| | m2: 10044 | m2: 10044 |
| | m3: -746 | m3: -746 |
| | m4: 948 | m4: 948 |
| | m5: 10137 | m5: 10137 |
| | m6: -169 | m6: -169 |
| | m7: 4288 | m7: 4288 |
| | m1: 1488 | m1: 1488 |
| | m2: -1334 | m2: -1334 |
| | m3: -102 | m3: -102 |

| Input | Expected | Got | |
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| | m4: -110 m5: 1782 m6: -4130 m7: 2190 m1: 720 m2: -31 m3: 42 m4: -12 m5: 957 m6: -819 m7: 1386 m1: 13 m2: -147 m3: 20 m4: 39 m5: -30 m6: -396 m7: 0 m1: -231 m2: 20 m3: 286 m4: -2 m5: -352 m6: -13 m7: -420 m1: 640 m2: -864 m3: -126 m4: -64 m5: -370 m6: -2310 m7: -1600 m1: 0 m2: 1430 m3: 3 m4: 27 m5: 432 m6: 2992 m7: 876 m1: -206 m2: -432 m3: -48 m4: 23 m5: -2035 m6: -833 m7: -4410 m1: 612 m2: 2067 m3: -252 m4: -327 m5: -3010 m6: 3928 m7: -5705 m1: -3520 m2: 75 m3: 80 m4: 252 m5: 0 m6: 3496 m7: 3058 m1: -680 m2: -195 m3: -35 m4: 169 m5: 460 m6: 234 m7: 1296 m1: 80 m2: -18 m3: 110 m4: 0 m5: 18 m6: -247 m7: 10 m1: 84 m2: 10 m3: 0 | m4: -110 m5: 1782 m6: -4130 m7: 2190 m1: 720 m2: -31 m3: 42 m4: -12 m5: 957 m6: -819 m7: 1386 m1: 13 m2: -147 m3: 20 m4: 39 m5: -30 m6: -396 m7: 0 m1: -231 m2: 20 m3: 286 m4: -2 m5: -352 m6: -13 m7: -420 m1: 640 m2: -864 m3: -126 m4: -64 m5: -370 m6: -2310 m7: -1600 m1: 0 m2: 1430 m3: 3 m4: 27 m5: 432 m6: 2992 m7: 876 m1: -206 m2: -432 m3: -48 m4: 23 m5: -2035 m6: -833 m7: -4410 m1: 612 m2: 2067 m3: -252 m4: -327 m5: -3010 m6: 3928 m7: -5705 m1: -3520 m2: 75 m3: 80 m4: 252 m5: 0 m6: 3496 m7: 3058 m1: -680 m2: -195 m3: -35 m4: 169 m5: 460 m6: 234 m7: 1296 m1: 80 m2: -18 m3: 110 m4: 0 m5: 18 m6: -247 m7: 10 m1: 84 m2: 10 m3: 0 | |

| Input | Expected | Got | |
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| | m4: -96 m5: -18 m6: 70 m7: 21 m1: -225 m2: 396 m3: 13 m4: -80 m5: -390 m6: 1036 m7: -469 m1: 2128 m2: -414 m3: -285 m4: 3 m5: 830 m6: -2660 m7: -596 m1: 2907 m2: 700 m3: -18 m4: -286 m5: -830 m6: -1431 m7: -4060 m1: 178 m2: 438 m3: 143 m4: 67 m5: -17 m6: 436 m7: -285 m1: 80396 m2: 38478 m3: -1114 m4: 2637 m5: 41585 m6: -1711 m7: 927 m1: 7680 m2: 5474 m3: 0 m4: -702 m5: 2444 m6: 1980 m7: -1734 m1: 4270 m2: 2961 m3: 200 m4: -864 m5: 1680 m6: 741 m7: -46 m1: 574 m2: 89 m3: 114 m4: 352 m5: 348 m6: 70 m7: -360 m1: 138 m2: -216 m3: -84 m4: 102 m5: 216 m6: -104 m7: -60 m1: 4075 m2: 2340 m3: -284 m4: 276 m5: 1584 m6: 357 m7: -868 m1: -402 m2: -700 m3: 0 | m4: -96 m5: -18 m6: 70 m7: 21 m1: -225 m2: 396 m3: 13 m4: -80 m5: -390 m6: 1036 m7: -469 m1: 2128 m2: -414 m3: -285 m4: 3 m5: 830 m6: -2660 m7: -596 m1: 2907 m2: 700 m3: -18 m4: -286 m5: -830 m6: -1431 m7: -4060 m1: 178 m2: 438 m3: 143 m4: 67 m5: -17 m6: 436 m7: -285 m1: 80396 m2: 38478 m3: -1114 m4: 2637 m5: 41585 m6: -1711 m7: 927 m1: 7680 m2: 5474 m3: 0 m4: -702 m5: 2444 m6: 1980 m7: -1734 m1: 4270 m2: 2961 m3: 200 m4: -864 m5: 1680 m6: 741 m7: -46 m1: 574 m2: 89 m3: 114 m4: 352 m5: 348 m6: 70 m7: -360 m1: 138 m2: -216 m3: -84 m4: 102 m5: 216 m6: -104 m7: -60 m1: 4075 m2: 2340 m3: -284 m4: 276 m5: 1584 m6: 357 m7: -868 m1: -402 m2: -700 m3: 0 | |

| Input | Expected | Got | |
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| | m4: 6 m5: 832 m6: -980 m7: 2112 m1: 2205 m2: 589 m3: -147 m4: -84 m5: 1216 m6: -896 m7: 171 m1: 14202 m2: 7907 m3: 1790 m4: 148 m5: 7623 m6: 340 m7: 3223 m1: 4170 m2: 2414 m3: -132 m4: -146 m5: 1508 m6: 84 m7: -644 m1: 2533 m2: 1672 m3: 75 m4: -370 m5: 888 m6: 54 m7: -12 m1: 923 m2: 372 m3: 114 m4: -66 m5: 427 m6: -144 m7: -110 ...snip... 9 470 476 424 333 518 383 708 570 919 853 537 718 693 733 507 691 672 495 727 836 719 654 673 709 814 830 616 711 614 527 732 566 703 735 762 578 684 627 558 509 880 686 521 585 552 595 482 589 567 415 671 805 733 587 661 609 742 709 441 669 553 558 749 480 500 646 659 499 562 556 648 477 825 606 499 632 648 609 460 462 575 357 607 729 617 503 742 600 706 770 580 713 641 556 608 507 638 575 622 432 617 525 689 595 784 743 527 730 729 660 443 683 632 496 600 829 801 637 719 694 691 805 671 692 593 566 772 538 665 807 675 549 635 559 640 524 816 665 439 679 601 634 410 536 668 468 712 771 738 613 675 683 674 856 558 709 614 539 646 522 599 658 559 511 649 537 776 662 920 808 578 769 809 717 627 640 651 580 751 932 841 705 748 822 802 889 678 885 684 674 730 639 640 777 771 591 784 611 591 497 649 625 508 602 655 620 403 473 508 381 567 722 601 625 697 568 562 717 625 670 524 471 653 535 538 636 554 381 537 500 643 546 893 721 556 676 695 764 466 630 682 518 690 892 878 594 727 609 704 883 620 818 608 610 787 535 537 787 692 504 736 538 706 526 823 791 614 765 801 705 529 664 658 595 712 895 686 709 834 769 726 871 742 785 688 636 782 722 654 804 717 517 766 605 651 529 791 890 528 739 729 761 | m4: 6 m5: 832 m6: -980 m7: 2112 m1: 2205 m2: 589 m3: -147 m4: -84 m5: 1216 m6: -896 m7: 171 m1: 14202 m2: 7907 m3: 1790 m4: 148 m5: 7623 m6: 340 m7: 3223 m1: 4170 m2: 2414 m3: -132 m4: -146 m5: 1508 m6: 84 m7: -644 m1: 2533 m2: 1672 m3: 75 m4: -370 m5: 888 m6: 54 m7: -12 m1: 923 m2: 372 m3: 114 m4: -66 m5: 427 m6: -144 m7: -110 ...snip... 9 470 476 424 333 518 383 708 570 919 853 537 718 693 733 507 691 672 495 727 836 719 654 673 709 814 830 616 711 614 527 732 566 703 735 762 578 684 627 558 509 880 686 521 585 552 595 482 589 567 415 671 805 733 587 661 609 742 709 441 669 553 558 749 480 500 646 659 499 562 556 648 477 825 606 499 632 648 609 460 462 575 357 607 729 617 503 742 600 706 770 580 713 641 556 608 507 638 575 622 432 617 525 689 595 784 743 527 730 729 660 443 683 632 496 600 829 801 637 719 694 691 805 671 692 593 566 772 538 665 807 675 549 635 559 640 524 816 665 439 679 601 634 410 536 668 468 712 771 738 613 675 683 674 856 558 709 614 539 646 522 599 658 559 511 649 537 776 662 920 808 578 769 809 717 627 640 651 580 751 932 841 705 748 822 802 889 678 885 684 674 730 639 640 777 771 591 784 611 591 497 649 625 508 602 655 620 403 473 508 381 567 722 601 625 697 568 562 717 625 670 524 471 653 535 538 636 554 381 537 500 643 546 893 721 556 676 695 764 466 630 682 518 690 892 878 594 727 609 704 883 620 818 608 610 787 535 537 787 692 504 736 538 706 526 823 791 614 765 801 705 529 664 658 595 712 895 686 709 834 769 726 871 742 785 688 636 782 722 654 804 717 517 766 605 651 529 791 890 528 739 729 761 462 | |

| Input | Expected | Got | |
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| | 462 600 633 548 763 847 719 662 781 675 725 860 599 793 572 553 714 643 591 719 651 525 750 540 681 607 880 754 508 760 750 687 518 609 652 589 620 841 770 663 705 775 778 857 657 715 682 645 753 603 699 749 706 611 743 629 589 445 628 548 566 574 558 593 439 478 549 382 523 672 520 576 548 529 517 642 518 571 402 411 586 539 504 577 541 483 562 491 586 488 781 605 535 631 539 670 459 523 485 365 585 767 655 648 617 608 584 649 471 623 488 455 694 473 495 630 591 474 633 456 706 539 834 778 564 794 723 713 526 675 720 520 691 788 716 665 718 754 767 882 708 685 671 551 796 644 643 829 690 574 666 626 575 486 686 660 476 668 627 637 471 512 603 378 637 698 538 609 599 620 607 771 535 604 507 517 590 530 549 540 532 409 575 499 659 445 746 634 521 589 650 728 487 508 676 444 623 721 720 616 633 521 637 726 630 662 529 546 715 476 465 737 610 461 617 504 733 589 893 789 464 804 699 641 555 654 696 497 817 772 722 643 722 824 821 914 636 765 733 588 700 643 614 782 659 554 746 639 759 606 882 815 629 873 860 840 552 692 771 590 739 968 712 687 751 743 773 943 724 753 691 582 791 702 661 815 697 522 776 599 598 453 890 722 534 673 639 767 526 532 607 453 639 779 715 695 708 601 684 770 577 714 612 547 692 545 605 633 652 519 660 613 554 460 762 638 477 699 556 677 378 486 458 406 564 709 660 623 658 569 606 687 544 550 550 464 673 464 616 581 532 464 587 466 649 541 755 658 557 768 732 675 498 566 581 513 614 776 682 627 655 644 625 787 613 683 553 546 708 654 560 674 587 505 689 590 564 488 706 630 457 700 638 577 455 540 548 508 565 789 643 604 639 686 669 762 606 607 576 562 592 538 539 579 549 432 653 486 583 552 748 684 493 721 613 557 438 574 546 549 538 845 691 488 673 639 657 758 537 723 579 561 684 525 550 664 569 469 690 506 739 539 785 645 555 738 739 742 523 586 727 435 653 838 652 685 710 742 742 853 675 668 651 589 749 579 635 700 656 514 666 559 754 532 861 719 582 765 770 779 477 644 683 518 692 922 794 691 808 694 704 833 637 749 632 548 769 633 671 768 642 508 741 572 540 487 712 596 499 548 532 601 429 476 433 371 477 772 670 562 612 560 565 644 490 634 487 439 634 380 525 591 565 488 559 399 466 424 708 597 443 521 576 647 426 388 449 434 530 663 611 625 636 498 562 664 515 598 483 560 587 386 542 498 547 419 617 469 694 608 867 880 577 709 753 762 527 614 749 550 741 841 730 719 732 738 741 897 642 785 623 657 802 625 587 806 699 573 699 612 768 530 877 788 549 821 802 781 477 644 703 501 645 872 769 645 | 600 633 548 763 847 719 662 781 675 725 860 599 793 572 553 714 643 591 719 651 525 750 540 681 607 880 754 508 760 750 687 518 609 652 589 620 841 770 663 705 775 778 857 657 715 682 645 753 603 699 749 706 611 743 629 589 445 628 548 566 574 558 593 439 478 549 382 523 672 520 576 548 529 517 642 518 571 402 411 586 539 504 577 541 483 562 491 586 488 781 605 535 631 539 670 459 523 485 365 585 767 655 648 617 608 584 649 471 623 488 455 694 473 495 630 591 474 633 456 706 539 834 778 564 794 723 713 526 675 720 520 691 788 716 665 718 754 767 882 708 685 671 551 796 644 643 829 690 574 666 626 575 486 686 660 476 668 627 637 471 512 603 378 637 698 538 609 599 620 607 771 535 604 507 517 590 530 549 540 532 409 575 499 659 445 746 634 521 589 650 728 487 508 676 444 623 721 720 616 633 521 637 726 630 662 529 546 715 476 465 737 610 461 617 504 733 589 893 789 464 804 699 641 555 654 696 497 817 772 722 643 722 824 821 914 636 765 733 588 700 643 614 782 659 554 746 639 759 606 882 815 629 873 860 840 552 692 771 590 739 968 712 687 751 743 773 943 724 753 691 582 791 702 661 815 697 522 776 599 598 453 890 722 534 673 639 767 526 532 607 453 639 779 715 695 708 601 684 770 577 714 612 547 692 545 605 633 652 519 660 613 554 460 762 638 477 699 556 677 378 486 458 406 564 709 660 623 658 569 606 687 544 550 550 464 673 464 616 581 532 464 587 466 649 541 755 658 557 768 732 675 498 566 581 513 614 776 682 627 655 644 625 787 613 683 553 546 708 654 560 674 587 505 689 590 564 488 706 630 457 700 638 577 455 540 548 508 565 789 643 604 639 686 669 762 606 607 576 562 592 538 539 579 549 432 653 486 583 552 748 684 493 721 613 557 438 574 546 549 538 845 691 488 673 639 657 758 537 723 579 561 684 525 550 664 569 469 690 506 739 539 785 645 555 738 739 742 523 586 727 435 653 838 652 685 710 742 742 853 675 668 651 589 749 579 635 700 656 514 666 559 754 532 861 719 582 765 770 779 477 644 683 518 692 922 794 691 808 694 704 833 637 749 632 548 769 633 671 768 642 508 741 572 540 487 712 596 499 548 532 601 429 476 433 371 477 772 670 562 612 560 565 644 490 634 487 439 634 380 525 591 565 488 559 399 466 424 708 597 443 521 576 647 426 388 449 434 530 663 611 625 636 498 562 664 515 598 483 560 587 386 542 498 547 419 617 469 694 608 867 880 577 709 753 762 527 614 749 550 741 841 730 719 732 738 741 897 642 785 623 657 802 625 587 806 699 573 699 612 768 530 877 788 549 821 802 781 477 644 703 501 645 872 769 645 | |

| | | Testing (Stress test) | | | | | | | | | | | | | |
|--|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|-----|--|--|--|--|--|--|
| | Input | Expected | | | | | | | Got | | | | | | |
| | | 791 685 713 883 726 758 684 541 735 662 749 767 671 498 710 558 589 469 665 643 461 702 608 615 414 525 604 478 600 747 675 594 691 682 655 737 581 646 600 541 672 530 526 685 552 473 635 477 770 556 767 817 633 769 700 753 568 588 626 550 743 811 687 707 770 808 761 884 763 835 673 654 823 626 600 818 723 569 697 519 | 713 883 726 758 684 541 735 662 749 767 671 498 710 558 589 469 665 643 461 702 608 615 414 525 604 478 600 747 675 594 691 682 655 737 581 646 600 541 672 530 526 685 552 473 635 477 770 556 767 817 633 769 700 753 568 588 626 550 743 811 687 707 770 808 761 884 763 835 673 654 823 626 600 818 723 569 697 519 | | | | | | | | | | | | |

Passed all tests! ✓

Question author's solution:

```

import java.util.Scanner;

class Matrix {

    private int[][] m;

    public int n; //only square matrices

    public Matrix(int n){

        this.n = n;

        m = new int[n][n];

    }

    public void setV(int i, int j, int val){

        m[i][j] = val;

    }

    public int v(int i, int j){

        return m[i][j];

    }

    public Matrix getSubmatrix(int startRow, int startCol, int dim){

        Matrix subM = new Matrix(dim);

        for (int i = 0; i<dim ; i++ )

            for (int j=0;j<dim ; j++ )

                subM.setV(i,j, m[startRow+i][startCol+j]);



        return subM;

    }

    public void putSubmatrix(int startRow, int startCol, Matrix b){

        for (int i = 0; i<b.n ; i++ )

            for (int j=0;j<b.n ; j++ )

                setV(startRow+i,startCol+j, b.v(i,j));

    }

    public Matrix sum(Matrix b){

        Matrix c = new Matrix(n);

        for(int i = 0; i< n;i++){

            for(int j = 0; j<n;j++){

                c.setV(i, j, m[i][j]+b.v(i, j));
            }
        }
    }
}

```

```
        }

    }

    return c;

}

public int sumAll(){

    int result = 0;

    for(int i = 0; i< n;i++){

        for(int j = 0; j<n;j++){

            result += m[i][j];

        }

    }

    return result;

}

public Matrix sub(Matrix b){

    Matrix c = new Matrix(n);

    for(int i = 0; i< n;i++){

        for(int j = 0; j<n;j++){

            c.setV(i, j, m[i][j]-b.v(i, j));

        }

    }

    return c;

}

//simple multiplication

public Matrix mult(Matrix b){

    Matrix c = new Matrix(n);

    for(int i = 0; i< n;i++){

        for(int j = 0; j<n;j++){

            int prod = 0;

            for (int k = 0; k < n; k++) {

                prod+=m[i][k]*b.v(k, j);

            }

            c.setV(i, j, prod);

        }

    }

    return c;

}
```

```
public Matrix multStrassen(Matrix b, int cutoff){  
    if (n <= cutoff)  
        return this.mult(b);  
  
    Matrix c = new Matrix(n);  
  
    Matrix a11 = getSubmatrix(0, 0, n/2);  
    Matrix a12 = getSubmatrix(0, n/2, n/2);  
    Matrix a21 = getSubmatrix(n/2, 0, n/2);  
    Matrix a22 = getSubmatrix(n/2, n/2, n/2);  
  
    Matrix b11 = b.getSubmatrix(0, 0, n/2);  
    Matrix b12 = b.getSubmatrix(0, n/2, n/2);  
    Matrix b21 = b.getSubmatrix(n/2, 0, n/2);  
    Matrix b22 = b.getSubmatrix(n/2, n/2, n/2);  
  
    Matrix m1 = a11.sum(a22).multStrassen(b11.sum(b22), cutoff); //(a11+a22)(b11+b22)  
    Matrix m2 = a21.sum(a22).multStrassen(b11, cutoff); //(a21+a22)b11  
    Matrix m3 = a11.multStrassen(b12.sub(b22), cutoff); // a11(b12-b22)  
    Matrix m4 = a22.multStrassen(b21.sub(b11), cutoff); //a22(b21-b11)  
    Matrix m5 = a11.sum(a12).multStrassen(b22, cutoff); //(a11+a12)b22  
    Matrix m6 = a21.sub(a11).multStrassen(b11.sum(b12), cutoff); //(a21-a11)(b11+b12)  
    Matrix m7 = a12.sub(a22).multStrassen(b21.sum(b22), cutoff); //(a12-a22)(b21+b22)  
  
    System.out.printf("m1: %d\n", m1.sumAll());  
    System.out.printf("m2: %d\n", m2.sumAll());  
    System.out.printf("m3: %d\n", m3.sumAll());  
    System.out.printf("m4: %d\n", m4.sumAll());  
    System.out.printf("m5: %d\n", m5.sumAll());  
    System.out.printf("m6: %d\n", m6.sumAll());  
    System.out.printf("m7: %d\n", m7.sumAll());  
  
    Matrix c11 = m1.sum(m4).sub(m5).sum(m7); // m1+m4-m5+m7  
    Matrix c12 = m3.sum(m5); // m3+m5  
    Matrix c21 = m2.sum(m4); // m2+m4  
    Matrix c22 = m1.sub(m2).sum(m3).sum(m6); //m1-m2+m3+m6  
  
    c.putSubmatrix(0,0, c11);  
    c.putSubmatrix(0,n/2, c12);  
    c.putSubmatrix(n/2,0, c21);  
}
```

```

c.putSubmatrix(n/2,n/2, c22);

return c;

}

public String toString(){

String s = "";

for(int i = 0; i< m.length;i++){

    for(int j = 0; j<m[0].length;j++){

        s+=m[i][j]+ " ";

    }

    s+="\n";

}

return s;

}

}

public class Izziv6{

public static void main(String[] args) {

Scanner sc = new Scanner(System.in);

int n = sc.nextInt();

int cutoff = sc.nextInt();

Matrix a = new Matrix(n);

Matrix b = new Matrix(n);

for ( int i = 0; i<n ; i++ )

    for ( int j = 0; j<n ; j++ )

        a.setV(i,j,sc.nextInt());



for ( int i = 0; i<n ; i++ )

    for ( int j = 0; j<n ; j++ )

        b.setV(i,j,sc.nextInt());



System.out.println(a.multStrassen(b, cutoff));
}
}
```

}

Pravilno

Marks for this submission: 1,00/1,00.

◀ Izviv 5

Skok na...

Testiranje Strassenovega algoritma (opcija naloga) ►