Vprašanje 1

Pravilno
Točk 1,00 od 1,00
Vprašanje z zastavico

Besedilo vprašanja

Napiši program, ki na vhod dobi dva polinoma (podana kot vektorja), ter ju zmnoži s pomočjo rekurzivne hitre Fourierjeve transformacije.

Vhodni podatki:

- Prvi argument programa je dolžina polinomov, oz. število koeficientov v podanih polinomih (oba polinoma bosta iste stopnje).
- Koeficiente obeh polinomov nato preberete s standarnega vhoda. Vsi koeficienti so realna števila (Java tip double).

Zaradi končne natančnosti tipa double, lahko dobite rezultate, ki odstopajo od rezultatov, ki so podani v primerih.

Sled

1. Najprej izpišite sled izvajanja FFT na prvem polinomu.
2. Nato na drugem polinomu.
3. Nazadnje pa še sled izvajanja inverznega FFT.
4. V zadnji vrstici izpišite še končni rezultat, tj. vektor dobljen iz prejšnjega koraka pomnožen z 1/n.

Sled izvajanja enega FFT

Kot sled izvajanja izpišite dobljeni vektor v vsakem klicu FFT.

Če dobimo na vhod vektor (polinom):

2 -3 -5 6

potem je sled izvajanja:

-3.0 7.0
3.0 -9.0
0.0 7.0-9.0i -6.0 7.0+9.0i

Glej tudi primer 1 s prosojnic.

Nasvet: za lažje delo uporabite podani razred Complex, da bodo tudi kompleksna števila enako izpisana pri vašem in našem izpisu.

For example:

Input	Result
2 1.0 1.0 1 1 1 1	1.0 1.0 1.0 1.0 2.0 1.0+1.0i 0.0 1.0-1.0i 1.0 1.0 1.0 1.0 2.0 1.0+1.0i 0.0 1.0-1.0i 4.0 4.0 0.0 4.0i 4.0 8.0 4.0 0.0 1.0 2.0 1.0 0.0

Answer:(penalty regime: 0 %)

Reset answer

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Pripombe

Input	Expected
2 1 1 1 1	1.0 1.0 1.0 1.0 2.0 1.0+1.0i 0.0 1.0-1.0i 1.0 1.0 1.0 1.0 2.0 1.0+1.0i 0.0 1.0-1.0i 4.0 4.0 0.0 4.0i 4.0 8.0 4.0 0.0 1.0 2.0 1.0 0.0
3 1 1 1 1 1 1	1.0 1.0 1.0 1.0 2.0 1.0+1.0i 0.0 1.0-1.0i 1.0 1.0 0.0 0.0 1.0 1.0 1.0 1.0 3.0 1.70711+1.70711i 1.0i 0.29289-0.29289i 1.0 0.29289+0.29289i -1.0i 1.70711-1.70711i 1.0 1.0 1.0 1.0 2.0 1.0+1.0i 0.0 1.0-1.0i 1.0 1.0 0.0 0.0 1.0 1.0 1.0 1.0 3.0 1.70711+1.70711i 1.0i 0.29289-0.29289i 1.0 0.29289+0.29289i -1.0i 1.70711-1.70711i 10.0 8.0 -2.0 0.0 8.0 8.0 12.0 8.0 6.0i 5.65685i -6.0i 5.65685i 0.0 5.65685+5.65685i 12.0i -5.65685+5.65685i 8.0 16.0 24.0 16.0 8.0 0.0 0.0 0.0 1.0 2.0 3.0 2.0 1.0 0.0 0.0 0.0
4 1 2 3 4 4 3 2 1	1.0 1.0 3.0 3.0 4.0 1.0+3.0i -2.0 1.0-3.0i 2.0 2.0 4.0 4.0 6.0 2.0+4.0i -2.0 2.0-4.0i 10.0 -0.41421+7.24264i -2.0-2.0i 2.41421+1.24264i -2.0 2.41421-1.24264i -2.0+2.0i -0.41421-7.24264i 4.0 4.0 2.0 2.0 6.0 4.0+2.0i 2.0 4.0-2.0i 3.0 3.0 1.0 1.0 4.0 3.0+1.0i 2.0 3.0-1.0i 10.0 5.41421+4.82843i 2.0+2.0i 2.58579+0.82843i 2.0 2.58579-0.82843i 2.0-2.0i 5.41421-4.82843i 96.0 104.0 0.0 -16.0i 96.0 88.0 96.0 120.0 -32.0+32.0i -42.42641+42.42641i -32.0-32.0i 42.42641+42.42641i -64.0 0.0 64.0i -84.85281+84.85281i 32.0 88.0 160.0 240.0 160.0 88.0 32.0 0.0 4.0 11.0 20.0 30.0 20.0 11.0 4.0 0.0
5 -1 1 -1 1 -1 1 -1 1 -1 1	-1.0 -1.0 -1.0 -1.0 -2.0 -1.0-1.0i 0.0 -1.0+1.0i -1.0 -1.0 0.0 0.0 -1.0 -1.0 -1.0 -1.0 -3.0 -1.70711-1.70711i -1.0i -0.29289+0.29289i -1.0 -0.29289-0.29289i 1.0i -1.70711+1.70711i 1.0 1.0 0.0 0.0 1.0 1.0 1.0 1.0 1.0 1.0 0.0 0.0 1.0 1.0 1.0 1.0 2.0 1.70711+0.70711i 1.0+1.0i 0.29289+0.70711i 0.0 0.29289-0.70711i 1.0-1.0i 1.70711-0.70711i -1.0 -0.40054-0.40054i 0.41421i -0.83409+0.83409i -1.0 0.2483+0.2483i 2.41421i -3.01367+3.01367i -5.0 -3.01367-3.01367i -2.41421i 0.2483-0.2483i -1.0 -0.83409-0.83409i -0.41421i -0.40054+0.40054i 1.0 1.0 1.0 1.0 2.0 1.0+1.0i 0.0 1.0-1.0i 1.0 1.0 0.0 0.0 1.0 1.0 1.0 1.0 3.0 1.70711+1.70711i 1.0i 0.29289-0.29289i 1.0 0.29289+0.29289i -1.0i 1.70711-1.70711i -1.0 -1.0 0.0 0.0 -1.0 -1.0 -1.0 -1.0 -1.0 -1.0 0.0 0.0 -1.0 -1.0 -1.0 -1.0 -2.0 -1.70711-0.70711i -1.0-1.0i -0.29289-0.70711i 0.0 -0.29289+0.70711i -1.0+1.0i -1.70711+0.70711i 1.0 0.40054+0.40054i -0.41421i 0.83409-0.83409i 1.0 -0.2483-0.2483i -2.41421i 3.01367-3.01367i 5.0 3.01367+3.01367i 2.41421i -0.2483+0.2483i 1.0 0.83409+0.83409i 0.41421i 0.40054-0.40054i -26.0 24.0 -2.0 0.0 -28.0 24.0 -24.0 24.0 6.0 -5.65685 6.0 5.65685 12.0 -5.65685-5.65685i 0.0 -5.65685+5.65685i -16.0 16.0 -24.0 32.0 -40.0 32.0 -24.0 16.0 -18.48528i 17.84354i -1.51472i 1.2681i -20.0i 1.2681+17.84354i -16.97056i -1.2681+17.84354i 1.51472i 1.2681i 18.48528i 17.84354i 20.0i 17.84354+1.2681i -16.97056i -17.84354+1.2681i 0.0 14.78207+6.12293i -16.97056-16.97056i 12.24587+29.56415i -40.0i -12.24587+29.56415i 16.97056-16.97056i -14.78207+6.12293i -16.0 32.0 -48.0 64.0 -80.0 64.0 -48.0 32.0 -16.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 -1.0 2.0 -3.0 4.0 -5.0 4.0 -3.0 2.0 -1.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
9 1 2 3 4 5 6 7 8 9	1.0 1.0 9.0 9.0

Input	Expected
1 1 1 1 1 1 1 1 1	10.0 1.0+9.0i -8.0 1.0-9.0i 5.0 5.0 0.0 0.0 5.0 5.0 5.0 5.0 15.0 4.53553+12.53553i -8.0+5.0i -2.53553-5.46447i 5.0 -2.53553+5.46447i -8.0-5.0i 4.53553-12.53553i 3.0 3.0 0.0 0.0 3.0 3.0 3.0 3.0 7.0 7.0 0.0 0.0 7.0 7.0 7.0 7.0 10.0 7.94975+4.94975i 3.0+7.0i -1.94975+4.94975i -4.0 -1.94975-4.94975i 3.0-7.0i 7.94975-4.94975i 25.0 9.98596+20.15074i -10.82843+12.07107i -7.85464-5.37161i 5.0-4.0i 2.78357+5.55732i -5.17157+2.07107i -0.91489-4.92033i 5.0 -0.91489+4.92033i -5.17157-2.07107i 2.78357-5.55732i 5.0+4.0i -7.85464+5.37161i -10.82843-12.07107i 9.98596-20.15074i 2.0 2.0 0.0 0.0 2.0 2.0 2.0 2.0 6.0 6.0 0.0 0.0 6.0 6.0 6.0 6.0 8.0 6.24264+4.24264i 2.0+6.0i -2.24264+4.24264i -4.0 -2.24264-4.24264i 2.0-6.0i 6.24264-4.24264i 4.0 4.0 0.0 0.0 4.0 4.0 4.0 4.0 8.0 8.0 0.0 0.0 8.0 8.0 8.0 8.0 12.0 9.65685+5.65685i 4.0+8.0i -1.65685+5.65685i -4.0 -1.65685-5.65685i 4.0-8.0i 9.65685-5.65685i 20.0 12.99963+13.16441i -0.82843+14.48528i -8.10294+4.87669i -4.0-4.0i 3.61766-3.60859i 4.82843+2.48528i -0.51434+4.67913i -4.0 -0.51434-4.67913i 4.82843-2.48528i 3.61766+3.60859i -4.0+4.0i -8.10294-4.87669i -0.82843-14.48528i 12.99963-13.16441i 45.0 20.16755+35.5983i -17.13707+25.1367i -17.30134-5.81854i 5.0-9.65685i 7.79387+6.56047i -5.61991+7.48303i -5.60445-4.51194i 5.0-4.0i 3.77468+5.32872i -4.72323+3.34089i -2.22673-4.55417i 5.0-1.65685i 1.59206+4.92468i -4.51978+0.99456i -0.19564-4.70318i 5.0 -0.19564+4.70318i -4.51978-0. 1.0 1.0 1.0 1.0 2.0 1.0+1.0i 0.0 1.0-1.0i 1.0 1.0 0.0 0.0 1.0 1.0 1.0 1.0 3.0 1.70711+1.70711i 1.0i 0.29289-0.29289i 1.0 0.29289+0.29289i -1.0i 1.70711-1.70711i 1.0 1.0 0.0 0.0 1.0 1.0 1.0 1.0 1.0 1.0 0.0 0.0 1.0 1.0 1.0 1.0 2.0 1.70711+0.70711i 1.0+1.0i 0.29289+0.70711i 0.0 0.29289-0.70711i 1.0-1.0i 1.70711-0.70711i 5.0 3.01367+3.01367i 2.41421i -0.2483+0.2483i 1.0 0.83409+0.83409i 0.41421i 0.40054-0.40054i 1.0 0.40054+0.40054i -0.41421i 0.83409-0.83409i 1.0 -0.2483-0.2483i -2.41421i 3.01367-3.01367i 1.0 1.0 0.0 0.0 1.0 1.0 1.0 1.0 1.0 1.0 0.0 0.0 1.0 1.0 1.0 1.0 2.0 1.70711+0.70711i 1.0+1.0i 0.29289+0.70711i 0.0 0.29289-0.70711i 1.0-1.0i 1.70711-0.70711i 1.0 1.0 0.0 0.0 1.0 1.0 1.0 1.0 1.0 1.0 0.0 0.0 1.0 1.0 1.0 1.0 2.0 1.70711+0.70711i 1.0+1.0i 0.29289+0.70711i 0.0 0.29289-0.70711i 1.0-1.0i 1.70711-0.70711i 4.0 3.01367+2.01367i 1.0+2.41421i -0.2483+1.2483i 0.0 0.83409-0.16591i 1.0+0.41421i 0.40054+0.59946i 0.0 0.40054-0.59946i 1.0-0.41421i 0.83409+0.16591i 0.0 -0.2483-1.2483i 1.0-2.41421i 3.01367-2.01367i 9.0 5.57659+5.57659i 5.02734i -1.14828+1.14828i 1.0 1.43543+1.43543i 1.49661i -0.10925+0.10925i 1.0 0.91034+0.91034i 0.66818i 0.23274-0.23274i 1.0 0.65167+0.65167i 0.19891i 0.45075-0.45075i 1.0 0.45075+0.45075i -0.19891i 0.65167-0.65167i 1.0 0.23274+0.23274i -0.66818i 0.91034-0.91034i 1. 410.0 400.0 10.0 -8.0i 420.0 392.0 400.0 408.0 10.0-8.0i -11.31371i 10.0+8.0i -11.31371i 20.0 -11.31371-11.31371i -16.0i 11.31371-11.31371i 440.0 376.0 384.0 392.0 400.0 408.0 416.0 424.0 -126.56854-85.25483i -126.17288-87.05292i -13.43146+5.25483i 8.96683-11.56676i -140.0-80.0i -137.73964-96.01975i -113.13708-90.50967i -114.60612-78.08608i -13.43146-5.25483i -8.96683-11.56676i -126.56854+85.25483i 126.17288-87.05292i -140.0+80.0i -96.01975-137.73964i 113.13708-90.50967i 78.08608+114.60612i -280.0 -303.03249-125.52017i -203.64675-203.64675i -88.78256-214.34005i -160.0i 27.55321-66.51933i -22.62742+22.62742i -140.42969+58.16788i 160.0 48.0 96.0 160.0 240.0 336.0 448.0 576.0 720.0 704.0 672.0 624.0 560.0 480.0 384.0 272.0 -88.25907+313.01482i -83.84275+308.95123i -0.30947+8.40654i -2.51994+8.16782i -88.56854+321.42136i -75.67493+311.47117i -87.9496+304.60828i -92.01056+306.43129i 0.19225+21.14641i 3.34868+20.06301i 24.37629+17.43223i -28.71986-8.93867i 24.56854+38.57864i -5.58999+48.78287i -24.18405+3.71418i 12.28735-8.65684i -64.0+360.0i -45.13295+349.91859i -84.23542+328.79233i -106.82034+303.86414i -113.13708+282.84271i -106.21691+273.02375i -91.66378+280.42423i -77.20079+308.99844i 24.37629-17.43223i 28.71986-8.93867i 0.19225-21.14641i -3.34868+20.06301i 24.56854-38.57864i 48.78287-5.58999i 24.18405+3.71418i 8.65684-12.28735i -0.30947-8.40654i 2.51994+8.16782i -88.25907-313.01482i 83.84275+308.95123i -88.56854-321.42136i 311.47117-75.67493i 87.9496+304.60828i -306.43129+92.01056i -64.0-360.0i 215.51599-279.34362i 328.79233-84.23542i 290.39778+139.331i 113.13708+282.84271i -117.95025+268.16364i -280.42423+91.66378i -273.08409-163.9057i -128.0 47.07769+9.36434i 88.69244+36.73761i 133.03514+88.89124i 169.70563+169.70563i 186.6716+279.37379i 171.44218+413.89803i 112.37203+564.93232i 720.0i -137.34359+690.47284i -257.16327+620.84705i -346.67583+518.83704i -395.9798+395.9798i -399.10541+266.67371i -354.76974+146.95044i -266 32.0 96.0 192.0 320.0 480.0 672.0 896.0 1152.0 1440.0 1408.0 1344.0 1248.0 1120.0 960.0 768.0 544.0 288.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0 3.0 6.0 10.0 15.0 21.0 28.0 36.0 45.0 44.0 42.0 39.0 35.0 30.0 24.0 17.0 9.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
8 8.0	8.0 -1.0 -1.0 7.0 8.0-1.0i 9.0 8.0+1.0i 3.0 3.0 -3.0 -3.0 0.0 3.0-3.0i 6.0 3.0+3.0i 7.0 12.24264-1.0i 9.0+6.0i 3.75736+1.0i 7.0 3.75736-1.0i 9.0-6.0i 12.24264+1.0i 2.0 2.0 -2.0 -2.0 0.0 2.0-2.0i 4.0 2.0+2.0i 1.0 1.0
8 2 3 1 -1 -2 -3 -4 -4 -3 -2 -1 1 3 2 8	

Input	Expected
-4.0 -4.0 -3.0 1.0-4.0i 5.0 1.0+4.0i -3.0 5.53553-4.12132i 4.0+5.0i -1.53553-0.12132i 3.0 -1.53553+0.12132i 4.0-5.0i 5.53553+4.12132i 4.0 18.93397-2.68925i 8.29289+12.36396i 3.28182-0.46508i 7.0+3.0i 4.2329-2.46508i 9.70711+0.36396i 5.55131-0.68925i 10.0 5.55131+0.68925i 9.70711-0.36396i 4.2329+2.46508i 7.0-3.0i 3.28182+0.46508i 8.29289-12.36396i 18.93397+2.68925i -4.0 -4.0 1.0 1.0 -3.0 -4.0+1.0i -5.0 -4.0-1.0i -2.0 -2.0 2.0 2.0 0.0 -2.0+2.0i -4.0 -2.0-2.0i -3.0 -6.82843+1.0i -5.0-4.0i -1.17157-1.0i -3.0 -1.17157+1.0i -5.0+4.0i -6.82843-1.0i -3.0 -3.0 3.0 3.0 0.0 -3.0+3.0i -6.0 -3.0-3.0i -1.0 -1.0 8.0 8.0 7.0 -1.0+8.0i -9.0 -1.0-8.0i 7.0 -9.36396+7.94975i -6.0-9.0i 3.36396+1.94975i -7.0 3.36396-1.94975i -6.0+9.0i -9.36396-7.94975i 4.0 -18.52184+4.76118i -2.87868-14.6066i -1.68557+2.85403i -3.0-7.0i -0.65757+4.85403i -7.12132-6.6066i 4.86498+2.76118i -10.0 4.86498-2.76118i -7.12132+6.6066i -0.65757-4.85403i -3.0+7.0i -1.68557-2.85403i -2.87868+14.6066i -18.52184-4.76118i -84.0 116.0 0.0 -116.0i -84.0 0.0 -84.0 232.0 90.0-90.0i 223.44574-223.44574i 90.0+90.0i -223.44574-223.44574i 180.0 0.0 -180.0i 446.89149-446.89149i 96.0 0.0 -264.0 -400.0 -264.0 0.0 96.0 864.0 -308.97771+127.98276i -366.79804+151.93272i 4.97771+12.01724i 13.38652+32.31792i -304.0+140.0i -334.48012+138.5462i -313.95541+115.96551i -399.11596+165.31924i 4.97771-12.01724i -13.38652+32.31792i -308.97771-127.98276i 366.79804+151.93272i -304.0-140.0i 138.5462-334.48012i 313.95541+115.96551i -165.31924+399.11596i -608.0 -473.02632-195.93392i -197.9899-197.9899i 0.0 280.0i -195.93392+473.02632i -429.92092+429.92092i -798.23192+330.63849i -512.0 -512.0 -544.0 -400.0 16.0 512.0 704.0 1728.0 704.0 512.0 16.0 -400.0 -544.0 -512.0 -512.0 0.0 -32.0 -32.0 -34.0 -25.0 1.0 32.0 44.0 108.0 44.0 32.0 1.0 -25.0 -34.0 -32.0 -32.0 0.0

Passed all tests!

Question author's solution (Java):

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Pravilno

Točke za ta prispevek: 1,00/1,00.