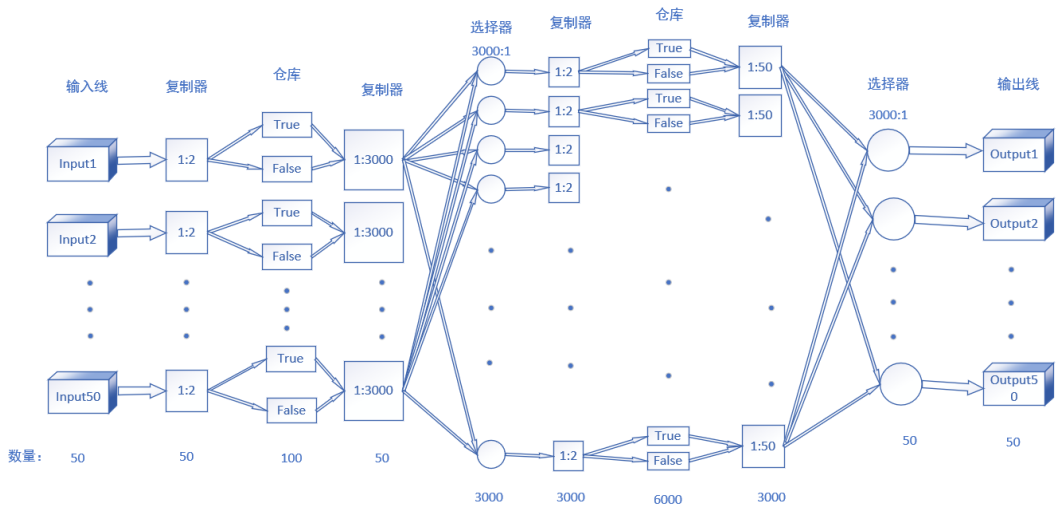
一．系统各单元互联图



二．系统设计介绍

基本思路——系统实现调度主要是靠最后一层与输出线连接的 50 个选择器实现的，需要做的是每秒传入每个选择器相同的输入流水线在 1 分钟内的完整 3000 个元素，通过控制每个时刻每个选择器选择指定位置的元素，来实现指定的输出。

即实现输入流水线的所有元素可以出现在任何输出流水线的任何时刻的任意位置。(注：当指定位置超出 3000 个元素范围，将输出-1，表示此位置为空。)

这里需要两组仓库(一组 100 个，一组 6000 个)，并将每组分成两半，在一开始的时候就将它们设定为刚好相反的输入/输出状态——保证在每一分钟都持续有仓库的进行输入元素，有仓库在进行输出元素。(注：True 表示输入状态，False 表示输出状态，所有仓库每隔一分钟就做一次输出/输出状态转换。)

假设现在是第 T 分钟，此时第一组仓库位于输入状态的 50 个仓库正在接收第 T 分钟的流水线元素输入，第一组仓库位于输出状态的 50 个仓库正在输出在第 T-1 分钟接收的流水线输入的元素，同时第二组仓库位于输入状态的 3000 个仓库正在接收第一组仓库输出的第 T-1 分钟的元素，而第二组仓库位于输出状态的 3000 个仓库正在输出第 T-2 分钟的元素。

所以第 T 分钟流水线的输入将在第 T+3 分钟进行流水线输出，延迟 X=3 分钟。

详细过程：

1.第一个 60s：读入数据:输入线*50->复制器*50->仓库*100

（1）50 条输入流水线在 1 秒钟内将 50 个元素传给 50 个复制器；
（2）50 个复制器将传进来的元素复制成 2 份传给仓库；
（3）100 个仓库始终有 50 个在输出，50 个在输入，此时位于输入状态的仓库将接收复制器传进来的元素。
（4）60s 结束后，这一分钟的 3000 个元素输入结束，所有仓库做输入/输出状态转换，即原来在输出的仓库现在做输入，反之亦然。

2.第二个 60s：导出成 50*60 的数据仓库：仓库*100->复制器*50->选择器*3000->复制器*3000->仓库*6000

（1）现在位于输出状态的 50 个仓库开始匀速输出元素到与之相连的 50 个复制器上；
（2）50 个复制器将传进来的元素复制成 3000 份分别传给与之相连的 3000 个选择器；
（3）3000 个选择器在每一秒都接收到 50 个元素，通过设定不同的选择位置(设置见代码中的 setParameter()函数)，保证 3000 个选择器将这一秒输出的 50 个元素送进到指定的仓库存储。
（4）同理，此时会有 3000 个仓库在输出，3000 个仓库在输入，位于输入状态的 3000 个仓库将匀速接收传进来的元素。
（5）60s 结束后，刚刚接收完元素的 3000 仓库马上在仓库内部进行复制操作——每个仓库只有一种元素，复制成 60 份，同时保证 3000 个仓库刚好包含传入进来的 3000 个元素种类（对这 3000 个仓库的复制参数设置见代码）。之后，所有仓库做输入/输出状态转换。

3.第三个 60s：输出数据：仓库*6000->复制器*3000->选择器*50->输出线*50

（1）现在位于输出状态的 3000 个仓库匀速输出与之相连的 3000 个复制器上；
（2）3000 个复制器将传进来的元素复制成 50 份分别传给与之相连的 50 个选择器；
（3）50 个选择器在每一秒都将接收到 3000 个元素(与来自于输入流水线相同的 3000 个元素)，通过设置每个选择器在每一秒钟的选择位置(即选择 3000 个元素的哪一个输出，或者选择输出空)，即可实现不同的指定输出，保证了每个输出元素可以来自于输入流水线输入的 3000 个元素中的任意一个或者输出空。
（4）60s 结束后，所有仓库做输入/输出状态转换。

三．调度器的控制

1.每个单元每秒钟的操作描述见上面。
2.调度器的控制实现是靠设置最后一层与输出线相连的 50 个选择器在每秒钟的选择位置来实现指定的输出。
代码中初步实现了四种指定输出的参数设定：

```
/**********************实现控制************************/
if (count == 0)
{
    if(n == 0 && i == 0)
        cout << "实现原序输出" << endl;
    SelectorAll[n + 3000].setPos(i * 50 + n);  //实现原序输出
}
if (count == 1)
{
    if (n == 0 && i == 0)
        cout << "实现线间逆序输出" << endl;
    SelectorAll[n + 3000].setPos(i * 50 + 49 - n);  //实现线间逆序输出
}
if (count == 2)
{
    if (n == 0 && i == 0)
        cout << "实现线内逆序输出" << endl;
    SelectorAll[n + 3000].setPos((59 - i) * 50 + n);    //实现线内逆序输出
}
if (count == 3)
{
    if (n == 0 && i == 0)
        cout << "实现线间逆序+线内逆序输出" << endl;
    SelectorAll[n + 3000].setPos((59 - i) * 50 + 49 - n);   //实现线间逆序+线内逆序输出
}
/**********************实现控制************************/
```

注：如果想要实现其他指定的输出，做相应每个时刻对相应选择器进行参数指定即可。

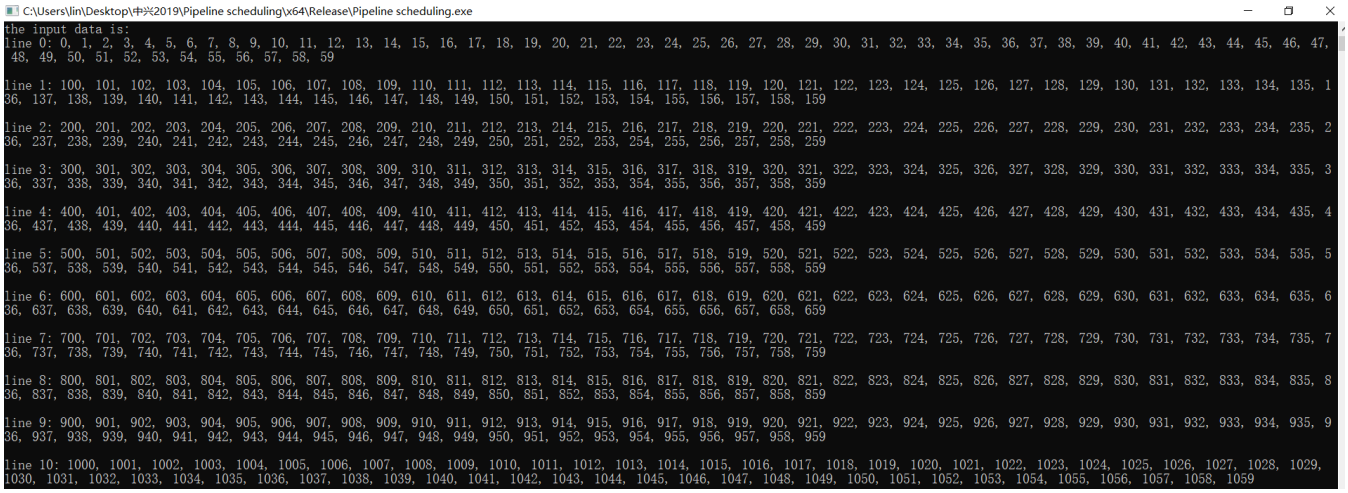
四．测试用例描述

1. 输入介绍:

所有输入元素用一个四位数的 int 型整数表示，前两位数表示位于第几条输入流水线，后两位数表示位于输入流水线上的第几个元素。

```
int data = i * 100 + j;
InputData[i].push_back(data);  //万位和千位表示在哪条流线水线上，十分位和个位表示是流水线上的第几个产品
```

Eg：第 10 条流水线数据：1000，1001，1002，1003，…，1059（共 60 个元素）



2. 测试

（1） 实现原序输出

```
实现原序输出
the output data is:
line 0: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47,
 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59

line 1: 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 1
36, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159

line 2: 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 2
36, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259

line 3: 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 3
36, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359

line 4: 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 4
36, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459

line 5: 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 5
36, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559

line 6: 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 6
36, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659

line 7: 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 7
36, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759

line 8: 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 8
36, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859

line 9: 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 9
36, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959

line 10: 1000, 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 1011, 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026, 1027, 1028, 1029,
1030, 1031, 1032, 1033, 1034, 1035, 1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1059

line 11: 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1125, 1126, 1127, 1128, 1129,
1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1157, 1158, 1159
```

（2） 实现线间逆序输出

```
实现线间逆序输出
the output data is:
line 0: 4900, 4901, 4902, 4903, 4904, 4905, 4906, 4907, 4908, 4909, 4910, 4911, 4912, 4913, 4914, 4915, 4916, 4917, 4918, 4919, 4920, 4921, 4922, 4923, 4924, 4925, 4926, 4927, 4928, 4929, 4
930, 4931, 4932, 4933, 4934, 4935, 4936, 4937, 4938, 4939, 4940, 4941, 4942, 4943, 4944, 4945, 4946, 4947, 4948, 4949, 4950, 4951, 4952, 4953, 4954, 4955, 4956, 4957, 4958, 4959

line 1: 4800, 4801, 4802, 4803, 4804, 4805, 4806, 4807, 4808, 4809, 4810, 4811, 4812, 4813, 4814, 4815, 4816, 4817, 4818, 4819, 4820, 4821, 4822, 4823, 4824, 4825, 4826, 4827, 4828, 4829, 4
830, 4831, 4832, 4833, 4834, 4835, 4836, 4837, 4838, 4839, 4840, 4841, 4842, 4843, 4844, 4845, 4846, 4847, 4848, 4849, 4850, 4851, 4852, 4853, 4854, 4855, 4856, 4857, 4858, 4859

line 2: 4700, 4701, 4702, 4703, 4704, 4705, 4706, 4707, 4708, 4709, 4710, 4711, 4712, 4713, 4714, 4715, 4716, 4717, 4718, 4719, 4720, 4721, 4722, 4723, 4724, 4725, 4726, 4727, 4728, 4729, 4
730, 4731, 4732, 4733, 4734, 4735, 4736, 4737, 4738, 4739, 4740, 4741, 4742, 4743, 4744, 4745, 4746, 4747, 4748, 4749, 4750, 4751, 4752, 4753, 4754, 4755, 4756, 4757, 4758, 4759

line 3: 4600, 4601, 4602, 4603, 4604, 4605, 4606, 4607, 4608, 4609, 4610, 4611, 4612, 4613, 4614, 4615, 4616, 4617, 4618, 4619, 4620, 4621, 4622, 4623, 4624, 4625, 4626, 4627, 4628, 4629, 4
630, 4631, 4632, 4633, 4634, 4635, 4636, 4637, 4638, 4639, 4640, 4641, 4642, 4643, 4644, 4645, 4646, 4647, 4648, 4649, 4650, 4651, 4652, 4653, 4654, 4655, 4656, 4657, 4658, 4659

line 4: 4500, 4501, 4502, 4503, 4504, 4505, 4506, 4507, 4508, 4509, 4510, 4511, 4512, 4513, 4514, 4515, 4516, 4517, 4518, 4519, 4520, 4521, 4522, 4523, 4524, 4525, 4526, 4527, 4528, 4529, 4
530, 4531, 4532, 4533, 4534, 4535, 4536, 4537, 4538, 4539, 4540, 4541, 4542, 4543, 4544, 4545, 4546, 4547, 4548, 4549, 4550, 4551, 4552, 4553, 4554, 4555, 4556, 4557, 4558, 4559

line 5: 4400, 4401, 4402, 4403, 4404, 4405, 4406, 4407, 4408, 4409, 4410, 4411, 4412, 4413, 4414, 4415, 4416, 4417, 4418, 4419, 4420, 4421, 4422, 4423, 4424, 4425, 4426, 4427, 4428, 4429, 4
430, 4431, 4432, 4433, 4434, 4435, 4436, 4437, 4438, 4439, 4440, 4441, 4442, 4443, 4444, 4445, 4446, 4447, 4448, 4449, 4450, 4451, 4452, 4453, 4454, 4455, 4456, 4457, 4458, 4459

line 6: 4300, 4301, 4302, 4303, 4304, 4305, 4306, 4307, 4308, 4309, 4310, 4311, 4312, 4313, 4314, 4315, 4316, 4317, 4318, 4319, 4320, 4321, 4322, 4323, 4324, 4325, 4326, 4327, 4328, 4329, 4
330, 4331, 4332, 4333, 4334, 4335, 4336, 4337, 4338, 4339, 4340, 4341, 4342, 4343, 4344, 4345, 4346, 4347, 4348, 4349, 4350, 4351, 4352, 4353, 4354, 4355, 4356, 4357, 4358, 4359

line 7: 4200, 4201, 4202, 4203, 4204, 4205, 4206, 4207, 4208, 4209, 4210, 4211, 4212, 4213, 4214, 4215, 4216, 4217, 4218, 4219, 4220, 4221, 4222, 4223, 4224, 4225, 4226, 4227, 4228, 4229, 4
230, 4231, 4232, 4233, 4234, 4235, 4236, 4237, 4238, 4239, 4240, 4241, 4242, 4243, 4244, 4245, 4246, 4247, 4248, 4249, 4250, 4251, 4252, 4253, 4254, 4255, 4256, 4257, 4258, 4259

line 8: 4100, 4101, 4102, 4103, 4104, 4105, 4106, 4107, 4108, 4109, 4110, 4111, 4112, 4113, 4114, 4115, 4116, 4117, 4118, 4119, 4120, 4121, 4122, 4123, 4124, 4125, 4126, 4127, 4128, 4129, 4
130, 4131, 4132, 4133, 4134, 4135, 4136, 4137, 4138, 4139, 4140, 4141, 4142, 4143, 4144, 4145, 4146, 4147, 4148, 4149, 4150, 4151, 4152, 4153, 4154, 4155, 4156, 4157, 4158, 4159

line 9: 4000, 4001, 4002, 4003, 4004, 4005, 4006, 4007, 4008, 4009, 4010, 4011, 4012, 4013, 4014, 4015, 4016, 4017, 4018, 4019, 4020, 4021, 4022, 4023, 4024, 4025, 4026, 4027, 4028, 4029, 4
030, 4031, 4032, 4033, 4034, 4035, 4036, 4037, 4038, 4039, 4040, 4041, 4042, 4043, 4044, 4045, 4046, 4047, 4048, 4049, 4050, 4051, 4052, 4053, 4054, 4055, 4056, 4057, 4058, 4059

line 10: 3900, 3901, 3902, 3903, 3904, 3905, 3906, 3907, 3908, 3909, 3910, 3911, 3912, 3913, 3914, 3915, 3916, 3917, 3918, 3919, 3920, 3921, 3922, 3923, 3924, 3925, 3926, 3927, 3928, 3929,
3930, 3931, 3932, 3933, 3934, 3935, 3936, 3937, 3938, 3939, 3940, 3941, 3942, 3943, 3944, 3945, 3946, 3947, 3948, 3949, 3950, 3951, 3952, 3953, 3954, 3955, 3956, 3957, 3958, 3959
```

（3） 实现线内逆序输出

```
实现线内逆序输出
the output data is:
line 0: 59, 58, 57, 56, 55, 54, 53, 52, 51, 50, 49, 48, 47, 46, 45, 44, 43, 42, 41, 40, 39, 38, 37, 36, 35, 34, 33, 32, 31, 30, 29, 28, 27, 26, 25, 24, 23, 22, 21, 20, 19, 18, 17, 16, 15, 1
4, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0

line 1: 159, 158, 157, 156, 155, 154, 153, 152, 151, 150, 149, 148, 147, 146, 145, 144, 143, 142, 141, 140, 139, 138, 137, 136, 135, 134, 133, 132, 131, 130, 129, 128, 127, 126, 125, 124, 1
23, 122, 121, 120, 119, 118, 117, 116, 115, 114, 113, 112, 111, 110, 109, 108, 107, 106, 105, 104, 103, 102, 101, 100

line 2: 259, 258, 257, 256, 255, 254, 253, 252, 251, 250, 249, 248, 247, 246, 245, 244, 243, 242, 241, 240, 239, 238, 237, 236, 235, 234, 233, 232, 231, 230, 229, 228, 227, 226, 225, 224, 2
23, 222, 221, 220, 219, 218, 217, 216, 215, 214, 213, 212, 211, 210, 209, 208, 207, 206, 205, 204, 203, 202, 201, 200

line 3: 359, 358, 357, 356, 355, 354, 353, 352, 351, 350, 349, 348, 347, 346, 345, 344, 343, 342, 341, 340, 339, 338, 337, 336, 335, 334, 333, 332, 331, 330, 329, 328, 327, 326, 325, 324, 3
23, 322, 321, 320, 319, 318, 317, 316, 315, 314, 313, 312, 311, 310, 309, 308, 307, 306, 305, 304, 303, 302, 301, 300

line 4: 459, 458, 457, 456, 455, 454, 453, 452, 451, 450, 449, 448, 447, 446, 445, 444, 443, 442, 441, 440, 439, 438, 437, 436, 435, 434, 433, 432, 431, 430, 429, 428, 427, 426, 425, 424, 4
23, 422, 421, 420, 419, 418, 417, 416, 415, 414, 413, 412, 411, 410, 409, 408, 407, 406, 405, 404, 403, 402, 401, 400

line 5: 559, 558, 557, 556, 555, 554, 553, 552, 551, 550, 549, 548, 547, 546, 545, 544, 543, 542, 541, 540, 539, 538, 537, 536, 535, 534, 533, 532, 531, 530, 529, 528, 527, 526, 525, 524, 5
23, 522, 521, 520, 519, 518, 517, 516, 515, 514, 513, 512, 511, 510, 509, 508, 507, 506, 505, 504, 503, 502, 501, 500

line 6: 659, 658, 657, 656, 655, 654, 653, 652, 651, 650, 649, 648, 647, 646, 645, 644, 643, 642, 641, 640, 639, 638, 637, 636, 635, 634, 633, 632, 631, 630, 629, 628, 627, 626, 625, 624, 6
23, 622, 621, 620, 619, 618, 617, 616, 615, 614, 613, 612, 611, 610, 609, 608, 607, 606, 605, 604, 603, 602, 601, 600

line 7: 759, 758, 757, 756, 755, 754, 753, 752, 751, 750, 749, 748, 747, 746, 745, 744, 743, 742, 741, 740, 739, 738, 737, 736, 735, 734, 733, 732, 731, 730, 729, 728, 727, 726, 725, 724, 7
23, 722, 721, 720, 719, 718, 717, 716, 715, 714, 713, 712, 711, 710, 709, 708, 707, 706, 705, 704, 703, 702, 701, 700

line 8: 859, 858, 857, 856, 855, 854, 853, 852, 851, 850, 849, 848, 847, 846, 845, 844, 843, 842, 841, 840, 839, 838, 837, 836, 835, 834, 833, 832, 831, 830, 829, 828, 827, 826, 825, 824, 8
23, 822, 821, 820, 819, 818, 817, 816, 815, 814, 813, 812, 811, 810, 809, 808, 807, 806, 805, 804, 803, 802, 801, 800

line 9: 959, 958, 957, 956, 955, 954, 953, 952, 951, 950, 949, 948, 947, 946, 945, 944, 943, 942, 941, 940, 939, 938, 937, 936, 935, 934, 933, 932, 931, 930, 929, 928, 927, 926, 925, 924, 9
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line 10: 1059, 1058, 1057, 1056, 1055, 1054, 1053, 1052, 1051, 1050, 1049, 1048, 1047, 1046, 1045, 1044, 1043, 1042, 1041, 1040, 1039, 1038, 1037, 1036, 1035, 1034, 1033, 1032, 1031, 1030,
1029, 1028, 1027, 1026, 1025, 1024, 1023, 1022, 1021, 1020, 1019, 1018, 1017, 1016, 1015, 1014, 1013, 1012, 1011, 1010, 1009, 1008, 1007, 1006, 1005, 1004, 1003, 1002, 1001, 1000
```

（4） 实现线间逆序+线内逆序输出

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实现线间逆序+线内逆序输出
the output data is:
line 0: 4959, 4958, 4957, 4956, 4955, 4954, 4953, 4952, 4951, 4950, 4949, 4948, 4947, 4946, 4945, 4944, 4943, 4942, 4941, 4940, 4939, 4938, 4937, 4936, 4935, 4934, 4933, 4932, 4931, 4930, 4
929, 4928, 4927, 4926, 4925, 4924, 4923, 4922, 4921, 4920, 4919, 4918, 4917, 4916, 4915, 4914, 4913, 4912, 4911, 4910, 4909, 4908, 4907, 4906, 4905, 4904, 4903, 4902, 4901, 4900

line 1: 4859, 4858, 4857, 4856, 4855, 4854, 4853, 4852, 4851, 4850, 4849, 4848, 4847, 4846, 4845, 4844, 4843, 4842, 4841, 4840, 4839, 4838, 4837, 4836, 4835, 4834, 4833, 4832, 4831, 4830, 4
829, 4828, 4827, 4826, 4825, 4824, 4823, 4822, 4821, 4820, 4819, 4818, 4817, 4816, 4815, 4814, 4813, 4812, 4811, 4810, 4809, 4808, 4807, 4806, 4805, 4804, 4803, 4802, 4801, 4800

line 2: 4759, 4758, 4757, 4756, 4755, 4754, 4753, 4752, 4751, 4750, 4749, 4748, 4747, 4746, 4745, 4744, 4743, 4742, 4741, 4740, 4739, 4738, 4737, 4736, 4735, 4734, 4733, 4732, 4731, 4730, 4
729, 4728, 4727, 4726, 4725, 4724, 4723, 4722, 4721, 4720, 4719, 4718, 4717, 4716, 4715, 4714, 4713, 4712, 4711, 4710, 4709, 4708, 4707, 4706, 4705, 4704, 4703, 4702, 4701, 4700

line 3: 4659, 4658, 4657, 4656, 4655, 4654, 4653, 4652, 4651, 4650, 4649, 4648, 4647, 4646, 4645, 4644, 4643, 4642, 4641, 4640, 4639, 4638, 4637, 4636, 4635, 4634, 4633, 4632, 4631, 4630, 4
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line 4: 4559, 4558, 4557, 4556, 4555, 4554, 4553, 4552, 4551, 4550, 4549, 4548, 4547, 4546, 4545, 4544, 4543, 4542, 4541, 4540, 4539, 4538, 4537, 4536, 4535, 4534, 4533, 4532, 4531, 4530, 4
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line 5: 4459, 4458, 4457, 4456, 4455, 4454, 4453, 4452, 4451, 4450, 4449, 4448, 4447, 4446, 4445, 4444, 4443, 4442, 4441, 4440, 4439, 4438, 4437, 4436, 4435, 4434, 4433, 4432, 4431, 4430, 4
429, 4428, 4427, 4426, 4425, 4424, 4423, 4422, 4421, 4420, 4419, 4418, 4417, 4416, 4415, 4414, 4413, 4412, 4411, 4410, 4409, 4408, 4407, 4406, 4405, 4404, 4403, 4402, 4401, 4400

line 6: 4359, 4358, 4357, 4356, 4355, 4354, 4353, 4352, 4351, 4350, 4349, 4348, 4347, 4346, 4345, 4344, 4343, 4342, 4341, 4340, 4339, 4338, 4337, 4336, 4335, 4334, 4333, 4332, 4331, 4330, 4
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line 7: 4259, 4258, 4257, 4256, 4255, 4254, 4253, 4252, 4251, 4250, 4249, 4248, 4247, 4246, 4245, 4244, 4243, 4242, 4241, 4240, 4239, 4238, 4237, 4236, 4235, 4234, 4233, 4232, 4231, 4230, 4
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line 8: 4159, 4158, 4157, 4156, 4155, 4154, 4153, 4152, 4151, 4150, 4149, 4148, 4147, 4146, 4145, 4144, 4143, 4142, 4141, 4140, 4139, 4138, 4137, 4136, 4135, 4134, 4133, 4132, 4131, 4130, 4
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line 9: 4059, 4058, 4057, 4056, 4055, 4054, 4053, 4052, 4051, 4050, 4049, 4048, 4047, 4046, 4045, 4044, 4043, 4042, 4041, 4040, 4039, 4038, 4037, 4036, 4035, 4034, 4033, 4032, 4031, 4030, 4
029, 4028, 4027, 4026, 4025, 4024, 4023, 4022, 4021, 4020, 4019, 4018, 4017, 4016, 4015, 4014, 4013, 4012, 4011, 4010, 4009, 4008, 4007, 4006, 4005, 4004, 4003, 4002, 4001, 4000

line 10: 3959, 3958, 3957, 3956, 3955, 3954, 3953, 3952, 3951, 3950, 3949, 3948, 3947, 3946, 3945, 3944, 3943, 3942, 3941, 3940, 3939, 3938, 3937, 3936, 3935, 3934, 3933, 3932, 3931, 3930,
3929, 3928, 3927, 3926, 3925, 3924, 3923, 3922, 3921, 3920, 3919, 3918, 3917, 3916, 3915, 3914, 3913, 3912, 3911, 3910, 3909, 3908, 3907, 3906, 3905, 3904, 3903, 3902, 3901, 3900

line 11: 3859, 3858, 3857, 3856, 3855, 3854, 3853, 3852, 3851, 3850, 3849, 3848, 3847, 3846, 3845, 3844, 3843, 3842, 3841, 3840, 3839, 3838, 3837, 3836, 3835, 3834, 3833, 3832, 3831, 3830,
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line 12: 3759, 3758, 3757, 3756, 3755, 3754, 3753, 3752, 3751, 3750, 3749, 3748, 3747, 3746, 3745, 3744, 3743, 3742, 3741, 3740, 3739, 3738, 3737, 3736, 3735, 3734, 3733, 3732, 3731, 3730,
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