|  |
| --- |
| Frogger |

Freddy Frog is sitting on a stone in the middle of a lake. Suddenly he notices Fiona Frog who is sitting on another stone. He plans to visit her, but since the water is dirty and full of tourists' sunscreen, he wants to avoid swimming and instead reach her by jumping.

Unfortunately Fiona's stone is out of his jump range. Therefore Freddy considers to use other stones as intermediate stops and reach her by a sequence of several small jumps.

To execute a given sequence of jumps, a frog's jump range obviously must be at least as long as the longest jump occuring in the sequence.

The *frog distance* (humans also call it *minimax distance*) between two stones therefore is defined as the minimum necessary jump range over all possible paths between the two stones.

You are given the coordinates of Freddy's stone, Fiona's stone and all other stones in the lake. Your job is to compute the frog distance between Freddy's and Fiona's stone.

**Input Specification**

The input file will contain one or more test cases. The first line of each test case will contain the number of stones *n* ( $2 \le n \le 200$). The next *n* lines each contain two integers *xi*, *yi* ( $0 \le x_i,y_i \le 1000$) representing the coordinates of stone #*i*. Stone #1 is Freddy's stone, stone #2 is Fiona's stone, the other *n*-2 stones are unoccupied. There's a blank line following each test case. Input is terminated by a value of zero (0) for *n*.

**Output Specification**

For each test case, print a line saying ``Scenario #*x*" and a line saying ``Frog Distance = *y*" where *x* is replaced by the test case number (they are numbered from 1) and *y* is replaced by the appropriate real number, printed to three decimals. Put a blank line after each test case, even after the last one.

**Sample Input**

2

0 0

3 4

3

17 4

19 4

18 5

0

**Sample Output**

Scenario #1

Frog Distance = 5.000

Scenario #2

Frog Distance = 1.414

2

0 0

3 4

3

17 4

19 4

18 5

4

0 0

3 4

3 0

0 2

8

0 0

5 8

2 1

4 2

6 3

1 3

3 4

3 10

19

859 529

351 265

820 658

806 492

341 285

37 509

617 723

381 49

914 728

626 971

979 416

998 618

29 963

713 55

104 169

934 933

54 10

971 77

227 988

109

59 808

367 637

70 330

876 134

904 101

508 10

968 901

735 292

75 518

241 723

59 923

564 157

539 606

256 584

636 621

924 227

432 850

385 922

414 231

416 564

727 621

491 596

394 767

763 56

420 54

61 651

885 932

20 756

490 54

871 715

409 162

108 209

4 905

841 157

611 213

988 142

71 636

950 951

884 928

146 551

764 14

558 922

117 202

48 61

135 702

504 315

562 562

146 507

100 601

449 20

935 1

355 725

975 729

618 567

76 349

921 238

406 396

609 667

504 693

7 874

894 959

278 56

310 228

12 154

904 756

586 233

628 594

1 195

899 400

93 858

595 545

406 672

820 43

499 815

589 734

931 167

184 423

495 856

474 244

874 706

605 116

641 249

822 264

252 916

357 890

379 791

783 735

242 934

979 918

932 503

737 134

664 145

7 678

733 254

659 73

999 773

56 772

154 914

0 62

377 142

19 253

508 504

686 795

412 681

680 671

21 305

193 178

351 243

562 129

88

360 490

115 312

737 800

41 854

741 546

609 841

384 919

461 389

911 143

45 503

678 65

615 668

592 934

787 760

682 695

3 740

220 788

995 123

631 359

849 840

289 14

866 401

33 415

202 84

302 586

287 316

904 691

215 515

504 809

53 597

664 641

376 312

121 155

757 709

661 683

335 275

693 883

624 712

57 7

822 294

872 366

129 943

225 394

108 406

733 245

9 219

225 12

267 643

49 18

334 600

863 292

298 255

683 83

243 112

30 130

759 403

994 681

625 686

894 859

152 300

23 534

121 702

49 9

844 993

706 553

563 218

266 600

658 306

858 864

420 839

475 576

110 892

324 170

834 81

890 219

142 910

240 140

616 924

49 40

389 310

927 623

387 599

525 546

970 443

661 134

95 257

637 555

925 559

199

83 762

342 125

35 944

464 310

216 814

81 547

545 778

114 977

965 967

848 592

283 78

416 451

492 4

570 921

581 283

307 761

343 674

332 419

206 206

607 491

72 872

771 822

870 722

358 868

720 902

211 661

987 869

893 711

330 974

796 579

315 380

800 387

16 305

811 225

885 709

565 169

197 20

410 325

379 979

979 984

374 655

764 169

634 929

818 22

770 225

877 193

745 518

832 158

385 315

869 221

449 422

466 290

448 224

808 806

845 267

47 893

52 746

427 266

775 812

517 936

286 891

753 892

456 940

433 223

791 824

67 744

571 440

815 933

455 762

524 65

349 920

74 939

52 115

611 578

266 517

118 638

384 42

617 118

21 100

78 822

111 570

363 482

902 831

598 747

794 961

188 888

787 510

71 815

893 533

553 409

394 778

143 924

651 155

955 247

282 179

88 420

950 380

629 143

455 61

468 140

559 940

495 63

845 878

762 272

577 468

373 390

870 334

611 695

915 377

67 523

899 736

526 895

769 501

738 247

969 738

336 453

957 539

968 731

319 54

578 300

148 51

58 203

416 307

170 701

340 62

839 294

746 523

988 931

138 971

380 371

56 107

812 371

593 640

506 355

992 582

649 670

5 328

23 318

380 364

415 684

969 562

785 819

685 861

310 831

78 714

181 659

156 765

241 912

277 173

564 604

369 676

527 889

45 188

829 452

500 575

545 246

263 137

543 215

837 281

635 462

613 668

562 766

743 137

220 627

690 376

491 561

817 92

692 75

859 616

465 907

94 123

883 22

935 896

561 771

789 268

193 594

418 266

294 19

591 369

505 486

404 944

268 850

207 521

546 170

865 54

308 93

787 343

59 129

548 435

774 466

313 567

174 809

810 602

495 428

14 318

224 274

903 883

805 525

808 169

32

856 763

1000 639

426 802

208 983

465 950

707 679

819 945

743 611

281 459

956 416

154 884

153 993

696 896

290 719

486 707

795 875

267 850

767 433

990 565

290 204

411 223

546 329

658 471

485 353

514 810

584 781

380 182

948 569

545 302

409 840

366 124

908 329

0

Scenario #1↵\r\n

Frog Distance = 5.000↵\r\n

↵\r\n

Scenario #2↵\r\n

Frog Distance = 1.414↵\r\n

↵\r\n

Scenario #3↵\r\n

Frog Distance = 3.606↵\r\n

↵\r\n

Scenario #4↵\r\n

Frog Distance = 4.472↵\r\n

↵\r\n

Scenario #5↵\r\n

Frog Distance = 339.094↵\r\n

↵\r\n

Scenario #6↵\r\n

Frog Distance = 108.171↵\r\n

↵\r\n

Scenario #7↵\r\n

Frog Distance = 121.413↵\r\n

↵\r\n

Scenario #8↵\r\n

Frog Distance = 91.411↵\r\n

↵\r\n

Scenario #9↵\r\n

Frog Distance = 175.206↵\r\n

↵\r\n