**R – PROGGRAMMING**

* Find the value of inverse of a matrix, determinant of a matrix by using the following values:  
  A=matrix(1:100, nrow=10)  
  B=matrix(1:1000, nrow=10)

SOLUTION: Let me explain how the code works in r-studio

A = matrix(1:100, nrow=10)

B = matrix(1:1000, nrow=10)

#Transpose A and B

t(A)

t(B)

#create two vectors (a and b)

a = c(1:2)

b = c(1:4)

#multpily matrices by vectors

X = a\*A

Y = b\*B

#re-assign the vectors a and b to equal the number of rows of the column for the corresponding matrix

a=c(1:10)

b=c(1:100)

#Multiply the matrix by a matrix

A %\*% a

B %\*% b

#Inverse a matrix

S=matrix(2:5, nrow=2)

#check det()

det(S)

Let me explain how the code runs:

1.The code creates two matrices A and B with the matrix function. A is a 10x10 matrix with values from 1 to 100, while B is a 10x100 matrix with values from 1 to 1000.

A = matrix(1:100, nrow=10)

B = matrix(1:1000, nrow=10)

2.The code then transposes A and B with the t function, resulting in a transposed matrix with the original rows as columns and vice versa.

#Transpose A and B

t(A)

t(B)

when we run in r-studio we get the result as below

t(A)

[,1] [,2] [,3] [,4] [,5] [,6] [,7] [,8] [,9] [,10]

[1,] 1 2 3 4 5 6 7 8 9 10

[2,] 11 12 13 14 15 16 17 18 19 20

[3,] 21 22 23 24 25 26 27 28 29 30

[4,] 31 32 33 34 35 36 37 38 39 40

[5,] 41 42 43 44 45 46 47 48 49 50

[6,] 51 52 53 54 55 56 57 58 59 60

[7,] 61 62 63 64 65 66 67 68 69 70

[8,] 71 72 73 74 75 76 77 78 79 80

[9,] 81 82 83 84 85 86 87 88 89 90

[10,] 91 92 93 94 95 96 97 98 99 100

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| t(B)  [,1] [,2] [,3] [,4] [,5] [,6] [,7] [,8] [,9] [,10]  [1,] 1 2 3 4 5 6 7 8 9 10  [2,] 11 12 13 14 15 16 17 18 19 20  [3,] 21 22 23 24 25 26 27 28 29 30  [4,] 31 32 33 34 35 36 37 38 39 40  [5,] 41 42 43 44 45 46 47 48 49 50  [6,] 51 52 53 54 55 56 57 58 59 60  [7,] 61 62 63 64 65 66 67 68 69 70  [8,] 71 72 73 74 75 76 77 78 79 80  [9,] 81 82 83 84 85 86 87 88 89 90  [10,] 91 92 93 94 95 96 97 98 99 100  [11,] 101 102 103 104 105 106 107 108 109 110  [12,] 111 112 113 114 115 116 117 118 119 120  [13,] 121 122 123 124 125 126 127 128 129 130  [14,] 131 132 133 134 135 136 137 138 139 140  [15,] 141 142 143 144 145 146 147 148 149 150  [16,] 151 152 153 154 155 156 157 158 159 160  [17,] 161 162 163 164 165 166 167 168 169 170  [18,] 171 172 173 174 175 176 177 178 179 180  [19,] 181 182 183 184 185 186 187 188 189 190  [20,] 191 192 193 194 195 196 197 198 199 200  [21,] 201 202 203 204 205 206 207 208 209 210  [22,] 211 212 213 214 215 216 217 218 219 220  [23,] 221 222 223 224 225 226 227 228 229 230  [24,] 231 232 233 234 235 236 237 238 239 240  [25,] 241 242 243 244 245 246 247 248 249 250  [26,] 251 252 253 254 255 256 257 258 259 260  [27,] 261 262 263 264 265 266 267 268 269 270  [28,] 271 272 273 274 275 276 277 278 279 280  [29,] 281 282 283 284 285 286 287 288 289 290  [30,] 291 292 293 294 295 296 297 298 299 300  [31,] 301 302 303 304 305 306 307 308 309 310  [32,] 311 312 313 314 315 316 317 318 319 320  [33,] 321 322 323 324 325 326 327 328 329 330  [34,] 331 332 333 334 335 336 337 338 339 340  [35,] 341 342 343 344 345 346 347 348 349 350  [36,] 351 352 353 354 355 356 357 358 359 360  [37,] 361 362 363 364 365 366 367 368 369 370  [38,] 371 372 373 374 375 376 377 378 379 380  [39,] 381 382 383 384 385 386 387 388 389 390  [40,] 391 392 393 394 395 396 397 398 399 400  [41,] 401 402 403 404 405 406 407 408 409 410  [42,] 411 412 413 414 415 416 417 418 419 420  [43,] 421 422 423 424 425 426 427 428 429 430  [44,] 431 432 433 434 435 436 437 438 439 440  [45,] 441 442 443 444 445 446 447 448 449 450  [46,] 451 452 453 454 455 456 457 458 459 460  [47,] 461 462 463 464 465 466 467 468 469 470  [48,] 471 472 473 474 475 476 477 478 479 480  [49,] 481 482 483 484 485 486 487 488 489 490  [50,] 491 492 493 494 495 496 497 498 499 500  [51,] 501 502 503 504 505 506 507 508 509 510  [52,] 511 512 513 514 515 516 517 518 519 520  [53,] 521 522 523 524 525 526 527 528 529 530  [54,] 531 532 533 534 535 536 537 538 539 540  [55,] 541 542 543 544 545 546 547 548 549 550  [56,] 551 552 553 554 555 556 557 558 559 560  [57,] 561 562 563 564 565 566 567 568 569 570  [58,] 571 572 573 574 575 576 577 578 579 580  [59,] 581 582 583 584 585 586 587 588 589 590  [60,] 591 592 593 594 595 596 597 598 599 600  [61,] 601 602 603 604 605 606 607 608 609 610  [62,] 611 612 613 614 615 616 617 618 619 620  [63,] 621 622 623 624 625 626 627 628 629 630  [64,] 631 632 633 634 635 636 637 638 639 640  [65,] 641 642 643 644 645 646 647 648 649 650  [66,] 651 652 653 654 655 656 657 658 659 660  [67,] 661 662 663 664 665 666 667 668 669 670  [68,] 671 672 673 674 675 676 677 678 679 680  [69,] 681 682 683 684 685 686 687 688 689 690  [70,] 691 692 693 694 695 696 697 698 699 700  [71,] 701 702 703 704 705 706 707 708 709 710  [72,] 711 712 713 714 715 716 717 718 719 720  [73,] 721 722 723 724 725 726 727 728 729 730  [74,] 731 732 733 734 735 736 737 738 739 740  [75,] 741 742 743 744 745 746 747 748 749 750  [76,] 751 752 753 754 755 756 757 758 759 760  [77,] 761 762 763 764 765 766 767 768 769 770  [78,] 771 772 773 774 775 776 777 778 779 780  [79,] 781 782 783 784 785 786 787 788 789 790  [80,] 791 792 793 794 795 796 797 798 799 800  [81,] 801 802 803 804 805 806 807 808 809 810  [82,] 811 812 813 814 815 816 817 818 819 820  [83,] 821 822 823 824 825 826 827 828 829 830  [84,] 831 832 833 834 835 836 837 838 839 840  [85,] 841 842 843 844 845 846 847 848 849 850  [86,] 851 852 853 854 855 856 857 858 859 860  [87,] 861 862 863 864 865 866 867 868 869 870  [88,] 871 872 873 874 875 876 877 878 879 880  [89,] 881 882 883 884 885 886 887 888 889 890  [90,] 891 892 893 894 895 896 897 898 899 900  [91,] 901 902 903 904 905 906 907 908 909 910  [92,] 911 912 913 914 915 916 917 918 919 920  [93,] 921 922 923 924 925 926 927 928 929 930  [94,] 931 932 933 934 935 936 937 938 939 940  [95,] 941 942 943 944 945 946 947 948 949 950  [96,] 951 952 953 954 955 956 957 958 959 960  [97,] 961 962 963 964 965 966 967 968 969 970  [98,] 971 972 973 974 975 976 977 978 979 980  [99,] 981 982 983 984 985 986 987 988 989 990  [100,] 991 992 993 994 995 996 997 998 999 1000  3.Two vectors a and b are created with the c function. a is a vector of length 2 with values 1 and 2, while b is a vector of length 4 with values 1 to 4.  #create two vectors (a and b)  > a = c(1:2)  > b = c(1:4)  4.The code multiplies the vectors a and b with the matrices A and B respectively, resulting in a 10x2 matrix and a 10x4 matrix.  #multpily matrices by vectors  > X = a\*A  > Y = b\*B  5.The vectors a and b are re-assigned to new values of length 10 and 100 respectively.  #re-assign the vectors a and b to equal the number of rows of the column  for the corresponding matrix  > a=c(1:10)  > b=c(1:100)  6.The code performs matrix multiplication of the matrices A and B with the vectors a and b respectively, resulting in two 10x1 matrices.  #Multiply the matrix by a matrix  A %\*% a  [,1]  [1,] 3355  [2,] 3410  [3,] 3465  [4,] 3520  [5,] 3575  [6,] 3630  [7,] 3685  [8,] 3740  [9,] 3795  [10,] 3850     |  | | --- | | B %\*% b  [,1]  [1,] 3338050  [2,] 3343100  [3,] 3348150  [4,] 3353200  [5,] 3358250  [6,] 3363300  [7,] 3368350  [8,] 3373400  [9,] 3378450  [10,] 3383500 | |  | | |  | | --- | |  | |   7.The code creates a 2x2 matrix S with values from 2 to 5 and calculates its determinant with the det function. The determinant is a scalar value that provides information about the linear transformation that the matrix represents.  #Inverse a matrix  > S=matrix(2:5, nrow=2)  > #check det()  > det(S)  [1] -2  Finally we get the det value as -2.   * **Here I am submitting the program in R-studio** |
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