1. Flowchart

I was provided with a flowchart for this question, so I simply followed it to define a function called 'Print\_values.' Afterward, I utilized the random function to generate three random numbers for testing the function. The results of all ten tests demonstrated that the function works perfectly, printing the numbers in descending order.

|  |  |
| --- | --- |
| No.1 | 78 51 14 |
| No.2 | 94 87 71 |
| No.3 | 75 53 30 |
| No.4 | 94 54 42 |
| No.5 | 61 50 22 |
| No.6 | 94 54 23 |
| No.7 | 89 82 1 |
| No.8 | 96 51 29 |
| No.9 | 68 60 21 |
| No.10 | 75 28 2 |

1. Matrix multiplication
   1. Use np.random.randint() method to generate matrix filled with random integers form 0 to 50 (I learned this from a csdn bolg

<https://blog.csdn.net/weixin_39274808/article/details/105181122>)

* 1. Define the function Matrix\_multip to do matrix multiplication and use the np.dot() method to do the same calculation to test the result

1. Pascal triangle

All the number of row j at location i except the first one and last one are the sum of the number of row j-1 at location i and i-1, so an array prev\_row is needed to calculate the new\_row, according to this rule of Pascal triangle, a Multidimensional Arrays is created to store the ‘triangle’ and calculate row by row to the wanted row.

The 100th row is [1, 99, 4851, 156849, 3764376, 71523144, 1120529256, 14887031544, 171200862756, 1731030945644, 15579278510796, 126050526132804, 924370524973896, 6186171974825304, 38000770702498296, 215337700647490344, 1130522928399324306, 5519611944537877494, 25144898858450330806, 107196674080761936594, 428786696323047746376, 1613054714739084379224, 5719012170438571889976, 19146258135816088501224, 60629817430084280253876, 181889452290252840761628, 517685364210719623706172, 1399667836569723427057428, 3599145865465003098147672, 8811701946483283447189128, 20560637875127661376774632, 45764000431735762419272568, 97248500917438495140954207, 197443926105102399225573693, 383273503615787010261407757, 711793649572175876199757263, 1265410932572757113244012912, 2154618614921181030658724688, 3515430371713505892127392912, 5498493658321124600506947888, 8247740487481686900760421832, 11868699725888281149874753368, 16390109145274293016493707032, 21726423750712434928840495368, 27651812046361280818524266832, 33796659167774898778196326128, 39674339023040098565708730672, 44739148260023940935799206928, 48467410615025936013782474172, 50445672272782096667406248628, 50445672272782096667406248628, 48467410615025936013782474172, 44739148260023940935799206928, 39674339023040098565708730672, 33796659167774898778196326128, 27651812046361280818524266832, 21726423750712434928840495368, 16390109145274293016493707032, 11868699725888281149874753368, 8247740487481686900760421832, 5498493658321124600506947888, 3515430371713505892127392912, 2154618614921181030658724688, 1265410932572757113244012912, 711793649572175876199757263, 383273503615787010261407757, 197443926105102399225573693, 97248500917438495140954207, 45764000431735762419272568, 20560637875127661376774632, 8811701946483283447189128, 3599145865465003098147672, 1399667836569723427057428, 517685364210719623706172, 181889452290252840761628, 60629817430084280253876, 19146258135816088501224, 5719012170438571889976, 1613054714739084379224, 428786696323047746376, 107196674080761936594, 25144898858450330806, 5519611944537877494, 1130522928399324306, 215337700647490344, 38000770702498296, 6186171974825304, 924370524973896, 126050526132804, 15579278510796, 1731030945644, 171200862756, 14887031544, 1120529256, 71523144, 3764376, 156849, 4851, 99, 1]

[1, 199, 19701, 1293699, 63391251, 2472258789, 79936367511, 2203959847089, 52895036330136, 1122550215450664, 21328454093562616, 366461620334848584, 5741232051912627816, 82585414900589338584, 1097206226536401212616, 13532210127282281622264, 155620416463746238656036, 1675208012521503627885564, 16938214348828536681954036, 161358778796735007338614764, 1452229009170615066047532876, 12378523459120956991548018324, 100153507987433197477070330076, 770746561468507650149628192324, 5652141450769056101097273410376, 39564990155383392707680913872632, 264781087962950397351403038993768, 1696560304355200694140471323923032, 10421727583896232835434323846955768, 61452255753319166029629978545842632, 348229449268808607501236545093108248, 1898412158917053376377708907120493352, 9966663834314530225982971762382590098, 50437359403955349931489584373269471102, 246252990031076120253743264881256829498, 1160906953003644566910503963011639339062, 5288576119238825249258962498164134766838, 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