## 问题二

题目中描述为“有的评委打分偏紧，有的评委打分偏松”，也就是说每个评委的评分标准不一样，而题目中要求的最终得分是以平均分的形式呈现的，显然直接作平均是不合理的，为此我们需要针对评委，对他们的数据分别进行调整。

### 数据总体分析

首先我们需要对于数据总体进行分析，由于分数分布大多为正态分布，因此我们需要对于数据进行显著性检验

取显著性水平为0.05，假设数据服从正态分布，备择假设为数据不服从正态分布。我们使用K-S检验。

通过计算得知，每位评委的打分情况和总体的打分情况的p值都大于0.05，因此接受原假设，即数据呈正态分布

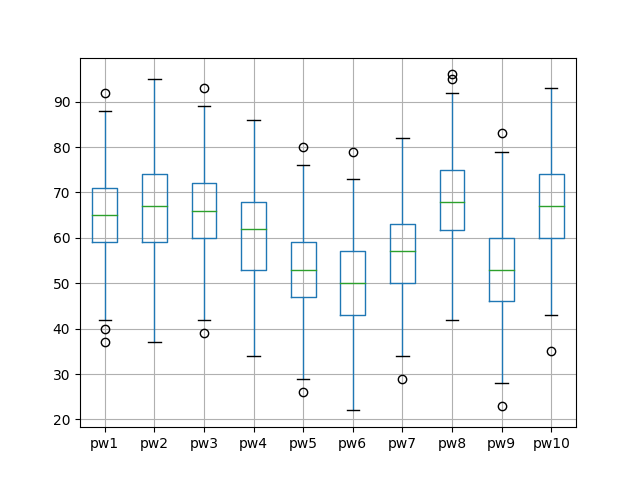
|  | D值 | P值 |
| --- | --- | --- |
| 1 | 0.04160948206793014 | 0.8646668230578755 |
| 2 | 0.03750966329942118 | 0.9309464316194455 |
| 3 | 0.038148354614719326 | 0.922109539580267 |
| 4 | 0.056971052038189196 | 0.516453874001993 |
| 5 | 0.03814835461471899 | 0.9221095395802718 |
| 6 | 0.0409681982110246 | 0.8764410590933746 |
| 7 | 0.042236924912615326 | 0.8527035610217388 |
| 8 | 0.047107227612820435 | 0.7482171297952694 |
| 9 | 0.04127894872161053 | 0.8707945465230698 |
| 10 | 0.04088679513953558 | 0.8779014514982229 |

### 异常值处理

由于对于每个评委的打分情况不确定，而异常值对于结果的影响又较为显著，所以我们需要对数据进行异常值处理。

同时，每个评委的打分标准不同，因此如果作总体的异常值检验是不合理的，所以我们对于每个评委的打分分别作异常件检验，得出结果后再对总体进行验证。

我们采用箱线图的方式来寻找异常值，结果如下：

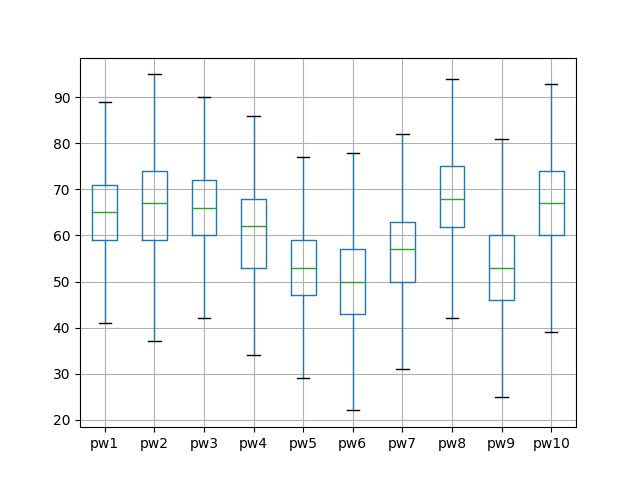


具体异常值如下表所示：

|  | 下限 | 上限 | 异常值 |
| --- | --- | --- | --- |
| 1 | 41.0 | 89.0 | 92,40,37 |
| 2 | 36.5 | 96.5 | null |
| 3 | 42.0 | 90.0 | 93,39 |
| 4 | 30.5 | 90.5 | null |
| 5 | 29.0 | 77.0 | 80,26 |
| 6 | 22.0 | 78.0 | 79 |
| 7 | 30.5 | 82.5 | 29 |
| 8 | 41.875 | 94.875 | 96,95 |
| 9 | 25.0 | 81.0 | 23,83 |
| 10 | 39.0 | 95.0 | 35 |

为了消除异常值，我们将超过上限的值规约为上限向下取整的整数值；将低于下限的值规约为下限向上取整的整数值.

调整异常值后的箱线图如图所示



在这一节的最后，我们还对调整异常值后的数据进行了关于正态分布的检验，正态分布的检验结果如下，结果显示调分后所有评委的打分情况都符合正态分布。

|  | D值 | P值 |
| --- | --- | --- |
| 1 | 0.03986626230262025 | 0.8955226483836971 |
| 2 | 0.03750966329942118 | 0.9309464316194455 |
| 3 | 0.03721059679223626 | 0.9348820917816804 |
| 4 | 0.056971052038189196 | 0.516453874001993 |
| 5 | 0.03721059679223604 | 0.9348820917816831 |
| 6 | 0.04133371326770563 | 0.869787846748304 |
| 7 | 0.04217972833583972 | 0.8538115246386145 |
| 8 | 0.047228068946345125 | 0.7454327302335191 |
| 9 | 0.04082802726852086 | 0.8789508597256801 |
| 10 | 0.04257860367463401 | 0.8460146442996113 |

### 标准化处理

题目的评分要求对每位评委的打分结果平均处理。

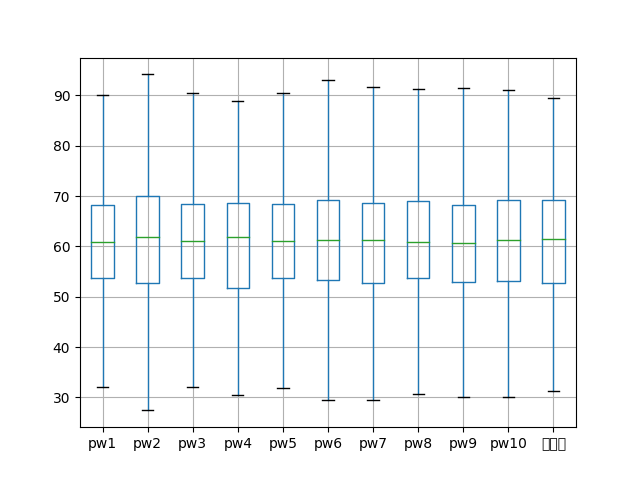
由于各个评委的打分标准不同，简单的平均处理显然不能很好地反映该组的真实得分情况；同时，每位评委有自己的评分标准，在修正了异常值后，每位评委的打分都服从正态分布，因此评委的打分有其合理性。从现实视角来说，如果简单地将十位评委的打分都按照一个统一的打分标准进行标准化处理，这无疑等价于一位评委重复十次打分，那么设置十位打分标准截然不同的评委就变得毫无意义。

因此，为了保证结果的合理性，我们对于每位评委的全部打分作Z-score标准化处理，如此便可以直接将十位评委的分求平均。在最后给定一个具有现实意义的打分时，我们选择了总体样本的均值和标准差对每组的得分进行逆Z-score处理，而这个最终结果将用于评奖.

这样的标准化处理过程既充分考虑了每位评委的打分情况，又确保了结果的可靠性

最后，为了确保最终调整结果的可靠性，我们对于调整后的数据再次进行异常值处理和正态分布检验

结果的箱线图和检验表如下：



|  | D值 | P值 |
| --- | --- | --- |
| 1 | 0.039839662704691525 | 0.8959643995136999 |
| 2 | 0.037509663299421514 | 0.930946431619441 |
| 3 | 0.03722622882793025 | 0.9346795994544034 |
| 4 | 0.05697105203818942 | 0.5164538740019882 |
| 5 | 0.03721059679223582 | 0.934882091781686 |
| 6 | 0.04133371326770563 | 0.869787846748304 |
| 7 | 0.04217972833583927 | 0.8538115246386233 |
| 8 | 0.04722806894634496 | 0.7454327302335232 |
| 9 | 0.040843201085901115 | 0.8786802984875202 |
| 10 | 0.0429062368090794 | 0.8394908800191188 |

最终数据如下

| pw1 | pw2 | pw3 | pw4 | pw5 | pw6 | pw7 | pw8 | pw9 | pw10 | 平均值 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 53.64652918239666 | 56.18794313826427 | 53.792238914395 | 51.815288806723885 | 53.79223891439501 | 57.91644289204908 | 52.63998569331193 | 57.44611864793851 | 58.39127743137336 | 45.13337340885112 | 54.07614370296987 |
| 68.21584024260923 | 67.70042571760062 | 67.23749556560156 | 74.27460892536212 | 67.23749556560156 | 64.732468317661 | 67.30262223523359 | 60.94709517149309 | 61.695864268065066 | 61.19533777325415 | 66.05392537824821 |
| 45.14776439727266 | 50.43170184859608 | 45.23616649999083 | 47.32342478299624 | 45.23616649999084 | 47.6924047536312 | 46.53055380084457 | 37.60725168112921 | 48.47751692129826 | 49.72250608439484 | 46.34054572701448 |
| 56.07474769243209 | 51.58295010652972 | 57.45912709199679 | 54.06122081858771 | 57.4591270919968 | 56.780438654447096 | 57.52753120728582 | 60.94709517149309 | 57.28974848580946 | 48.57522291550891 | 55.775720923608745 |
| 83.99926055783952 | 78.06166003900336 | 84.3496403944099 | 88.87316700247698 | 84.3496403944099 | 80.63652764408882 | 84.40903153414217 | 86.62092301089335 | 89.23408790716257 | 87.58285065763056 | 84.81167891420571 |
| 46.36187365229037 | 48.129205332728816 | 47.68075861839202 | 48.44639078892815 | 47.680758618392034 | 49.96441322883517 | 47.752440179338045 | 41.1082282046838 | 53.98516164911776 | 42.83880707107926 | 47.39480373437854 |
| 76.71460502773323 | 68.85167397553425 | 74.57127192080513 | 73.15164291943022 | 74.57127192080515 | 68.14048103046696 | 77.07771326318135 | 74.95100126571141 | 77.11726950595967 | 69.22631995545566 | 73.43732507850831 |
| 75.50049577271552 | 75.75916352313608 | 74.57127192080513 | 73.15164291943022 | 74.57127192080515 | 77.22851493128286 | 74.6339405061944 | 72.61701691667503 | 70.50809583257626 | 72.66816946211347 | 74.1209583705734 |
| 41.50543663221952 | 43.524212300994265 | 41.56927832238904 | 42.83156075926859 | 41.56927832238905 | 48.82840899123319 | 41.643008286870696 | 44.60920472823838 | 30.0 | 45.13337340885112 | 42.12137617524539 |
| 81.57104204780408 | 76.91041178106971 | 79.46045615760752 | 81.01240496095359 | 79.46045615760752 | 79.50052340648683 | 78.29959964167483 | 79.6189699637842 | 68.30503794144846 | 77.25730213765718 | 78.1396204196094 |
| 59.71707545748523 | 60.79293616999881 | 57.45912709199679 | 54.06122081858771 | 57.4591270919968 | 55.64443441684511 | 55.08375845029887 | 57.44611864793851 | 58.39127743137336 | 64.63718727991194 | 58.069226285643325 |
| 54.86063843741437 | 56.18794313826427 | 55.0145349735956 | 55.18418682451962 | 55.01453497359561 | 52.236421704039145 | 55.08375845029887 | 56.27912647342032 | 57.28974848580946 | 47.427939746622975 | 54.45788332075803 |
| 51.21831067236123 | 46.97795707479518 | 50.125350736793216 | 51.815288806723885 | 50.12535073679322 | 57.91644289204908 | 50.19621293632499 | 46.943189077274766 | 47.37598797573436 | 47.427939746622975 | 50.0122030655473 |
| 63.359403222538376 | 66.54917745966699 | 63.57060738799977 | 63.044948866043 | 63.57060738799978 | 62.46045984245703 | 66.08073585674012 | 60.94709517149309 | 63.898922159192864 | 73.81545263099939 | 64.72974099851305 |
| 87.64158832289266 | 83.81790132867152 | 88.0165285720117 | 84.38130297874932 | 88.01652857201171 | 87.45255306970074 | 86.85280429112912 | 79.6189699637842 | 76.01574056039577 | 88.7301338265165 | 85.05440514858631 |
| 52.43241992737895 | 55.03669488033063 | 53.792238914395 | 50.69232280079197 | 53.79223891439501 | 57.91644289204908 | 53.8618720718054 | 56.27912647342032 | 49.57904586686216 | 48.57522291550891 | 53.19576256569375 |
| 67.00173098759151 | 63.09543268586608 | 64.79290344720036 | 72.0286769134983 | 64.79290344720037 | 62.46045984245703 | 63.63696309975317 | 57.44611864793851 | 63.898922159192864 | 61.19533777325415 | 64.03494490039523 |
| 52.43241992737895 | 55.03669488033063 | 53.792238914395 | 49.56935679486006 | 53.79223891439501 | 48.82840899123319 | 53.8618720718054 | 57.44611864793851 | 51.78210375798996 | 50.86978925328077 | 52.74112421536074 |
| 65.7876217325738 | 60.79293616999881 | 64.79290344720036 | 57.43011883638344 | 64.79290344720037 | 67.00447679286498 | 66.08073585674012 | 60.94709517149309 | 68.30503794144846 | 62.34262094214008 | 63.827645033804345 |
| 62.14529396752066 | 58.490439654131535 | 61.126015269598575 | 54.06122081858771 | 61.12601526959859 | 62.46045984245703 | 59.97130396427276 | 69.11604039312044 | 59.49280637693726 | 56.60620509771043 | 60.4595800653935 |
| 64.5735124775561 | 65.39792920173335 | 66.01519950640096 | 60.79901685417918 | 66.01519950640098 | 68.14048103046696 | 64.85884947824664 | 65.61506386956586 | 72.71115372370407 | 64.63718727991194 | 65.8763592928166 |
| 57.2888569474498 | 58.490439654131535 | 58.681423151197386 | 49.56935679486006 | 58.68142315119739 | 62.46045984245703 | 58.74941758577928 | 58.613110822456704 | 57.28974848580946 | 49.72250608439484 | 56.95467425197334 |
| 48.790092162325806 | 51.58295010652972 | 50.125350736793216 | 46.20045877706433 | 50.12535073679322 | 54.50843017924312 | 50.19621293632499 | 57.44611864793851 | 50.68057481242606 | 46.28065657773705 | 50.5936195673176 |
| 65.7876217325738 | 65.39792920173335 | 64.79290344720036 | 59.676050848247264 | 64.79290344720037 | 67.00447679286498 | 64.85884947824664 | 69.11604039312044 | 58.39127743137336 | 64.63718727991194 | 64.44552400524725 |
| 71.85816800766237 | 71.15417049140153 | 72.12667980240394 | 83.25833697281742 | 72.12667980240396 | 71.54849374327293 | 69.74639499222053 | 76.11799344022961 | 70.50809583257626 | 82.99371798208685 | 74.14387310670755 |
| 57.2888569474498 | 60.79293616999881 | 55.0145349735956 | 60.79901685417918 | 55.01453497359561 | 57.91644289204908 | 56.305644828792346 | 58.613110822456704 | 47.37598797573436 | 57.75348826659636 | 56.68745547044479 |
| 68.21584024260923 | 70.0029222334679 | 67.23749556560156 | 76.52054093722595 | 67.23749556560156 | 68.14048103046696 | 68.52450861372705 | 64.44807169504767 | 69.40656688701236 | 63.489904111026014 | 68.32238268817862 |
| 62.14529396752066 | 64.24668094379972 | 63.57060738799977 | 66.41384688383874 | 63.57060738799978 | 65.86847255526298 | 63.63696309975317 | 62.11408734601128 | 61.695864268065066 | 60.04805460436822 | 63.331047844461935 |
| 56.07474769243209 | 63.09543268586608 | 56.2368310327962 | 61.92198286011109 | 56.2368310327962 | 60.18845136725305 | 57.52753120728582 | 64.44807169504767 | 48.47751692129826 | 48.57522291550891 | 57.278261941039545 |
| 57.2888569474498 | 65.39792920173335 | 57.45912709199679 | 59.676050848247264 | 57.4591270919968 | 59.05244712965106 | 56.305644828792346 | 57.44611864793851 | 50.68057481242606 | 58.90077143548229 | 57.966664803571426 |
| 53.64652918239666 | 50.43170184859608 | 51.34764679599381 | 49.56935679486006 | 51.34764679599382 | 49.96441322883517 | 48.97432655783152 | 46.943189077274766 | 56.18821954024556 | 56.60620509771043 | 51.501923491973784 |
| 48.790092162325806 | 56.18794313826427 | 50.125350736793216 | 47.32342478299624 | 50.12535073679322 | 51.10041746643716 | 50.19621293632499 | 50.44416560082935 | 46.27445903017046 | 52.01707242216671 | 50.258448901310146 |
| 54.86063843741437 | 52.73419836446335 | 55.0145349735956 | 49.56935679486006 | 55.01453497359561 | 55.64443441684511 | 52.63998569331193 | 48.11018125179296 | 52.88363270355386 | 53.16435559105263 | 52.96358532004855 |
| 63.359403222538376 | 58.490439654131535 | 63.57060738799977 | 64.16791487197492 | 63.57060738799978 | 64.732468317661 | 63.63696309975317 | 67.94904821860226 | 59.49280637693726 | 54.31163875993856 | 62.32818972975366 |
| 65.7876217325738 | 64.24668094379972 | 64.79290344720036 | 65.29088087790683 | 64.79290344720037 | 73.82050221847689 | 63.63696309975317 | 64.44807169504767 | 60.594335322501166 | 63.489904111026014 | 65.09007668954861 |
| 59.71707545748523 | 61.94418442793244 | 59.90371921039798 | 60.79901685417918 | 59.90371921039799 | 63.596464080059015 | 59.97130396427276 | 62.11408734601128 | 56.18821954024556 | 53.16435559105263 | 59.73021456820341 |
| 50.00420141734352 | 48.129205332728816 | 48.90305467759261 | 39.462662741472855 | 48.90305467759263 | 43.14838780322325 | 48.97432655783152 | 48.11018125179296 | 41.86834324791485 | 50.86978925328077 | 46.83732069607738 |
| 48.790092162325806 | 50.43170184859608 | 48.90305467759261 | 58.55308484231536 | 48.90305467759263 | 40.87637932801928 | 48.97432655783152 | 50.44416560082935 | 47.37598797573436 | 37.1023912266496 | 48.03542388974866 |
| 37.863108867166375 | 35.465474495458814 | 36.68009408558666 | 30.47893469401756 | 36.68009408558667 | 30.6523411896014 | 36.755462772896806 | 44.60920472823838 | 35.259169574531455 | 49.72250608439484 | 37.4166390577479 |
| 47.57598290730809 | 42.37296404306064 | 47.68075861839202 | 51.815288806723885 | 47.680758618392034 | 45.420396278427226 | 47.752440179338045 | 52.778149949865735 | 41.86834324791485 | 54.31163875993856 | 47.925672140936115 |
| 68.21584024260923 | 70.0029222334679 | 67.23749556560156 | 67.53681288977064 | 67.23749556560156 | 65.86847255526298 | 68.52450861372705 | 66.78205604408406 | 67.20350899588456 | 71.52088629322753 | 68.01299989992371 |
| 67.00173098759151 | 73.4566670072688 | 67.23749556560156 | 67.53681288977064 | 67.23749556560156 | 69.27648526806895 | 66.08073585674012 | 62.11408734601128 | 61.695864268065066 | 70.3736031243416 | 67.2010977879061 |
| 43.93365514225495 | 44.67546055892791 | 41.56927832238904 | 47.32342478299624 | 41.56927832238905 | 44.28439204082524 | 41.643008286870696 | 49.27717342631115 | 41.86834324791485 | 41.691523902193325 | 43.78355380330724 |
| 45.14776439727266 | 41.221715785127 | 44.01387044079023 | 42.83156075926859 | 44.01387044079024 | 40.87637932801928 | 45.30866742235111 | 44.60920472823838 | 51.78210375798996 | 49.72250608439484 | 44.95276431442422 |
| 58.50296620246752 | 53.88544662239699 | 57.45912709199679 | 58.55308484231536 | 57.4591270919968 | 49.96441322883517 | 58.74941758577928 | 58.613110822456704 | 66.10198005032066 | 62.34262094214008 | 58.163129448070535 |
| 69.42994949762695 | 63.09543268586608 | 67.23749556560156 | 66.41384688383874 | 67.23749556560156 | 65.86847255526298 | 66.08073585674012 | 67.94904821860226 | 65.00045110475676 | 64.63718727991194 | 66.29501152138089 |
| 39.07721812218409 | 43.524212300994265 | 40.34698226318845 | 48.44639078892815 | 40.34698226318845 | 44.28439204082524 | 41.643008286870696 | 35.27326733209283 | 40.76681430235095 | 43.98609023996519 | 41.76953579405883 |
| 74.2863865176978 | 78.06166003900336 | 74.57127192080513 | 72.0286769134983 | 74.57127192080515 | 73.82050221847689 | 73.41205412770094 | 69.11604039312044 | 63.898922159192864 | 73.81545263099939 | 72.75822388413002 |
| 65.7876217325738 | 71.15417049140153 | 66.01519950640096 | 68.65977889570256 | 66.01519950640098 | 59.05244712965106 | 67.30262223523359 | 65.61506386956586 | 63.898922159192864 | 73.81545263099939 | 66.73164781571225 |
| 50.00420141734352 | 52.73419836446335 | 48.90305467759261 | 51.815288806723885 | 48.90305467759263 | 44.28439204082524 | 47.752440179338045 | 58.613110822456704 | 46.27445903017046 | 48.57522291550891 | 49.785942293201536 |
| 53.64652918239666 | 55.03669488033063 | 53.792238914395 | 49.56935679486006 | 53.79223891439501 | 53.37242594164113 | 53.8618720718054 | 56.27912647342032 | 56.18821954024556 | 57.75348826659636 | 54.329219098008615 |
| 54.86063843741437 | 51.58295010652972 | 57.45912709199679 | 52.9382548126558 | 57.4591270919968 | 61.32445560485504 | 57.52753120728582 | 53.94514212438393 | 63.898922159192864 | 54.31163875993856 | 56.530778739624964 |
| 47.57598290730809 | 43.524212300994265 | 46.45846255919143 | 48.44639078892815 | 46.45846255919143 | 44.28439204082524 | 47.752440179338045 | 44.60920472823838 | 49.57904586686216 | 56.60620509771043 | 47.52947990285876 |
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| 63.359403222538376 | 63.09543268586608 | 62.34831132879917 | 67.53681288977064 | 62.348311328799184 | 62.46045984245703 | 61.19319034276623 | 60.94709517149309 | 56.18821954024556 | 65.78447044879788 | 62.526170680153314 |
| 86.42747906787494 | 82.6666530707379 | 86.79423251281109 | 87.75020099654506 | 86.7942325128111 | 86.31654883209876 | 88.07469066962258 | 88.95490735992973 | 83.72644317934308 | 82.99371798208685 | 86.04991061838611 |
| 54.86063843741437 | 51.58295010652972 | 55.0145349735956 | 57.43011883638344 | 55.01453497359561 | 57.91644289204908 | 56.305644828792346 | 53.94514212438393 | 66.10198005032066 | 60.04805460436822 | 56.822004182743306 |
| 62.14529396752066 | 63.09543268586608 | 62.34831132879917 | 63.044948866043 | 62.348311328799184 | 62.46045984245703 | 61.19319034276623 | 66.78205604408406 | 60.594335322501166 | 63.489904111026014 | 62.750224383986264 |
| 64.5735124775561 | 61.94418442793244 | 66.01519950640096 | 69.78274490163447 | 66.01519950640098 | 62.46045984245703 | 67.30262223523359 | 60.94709517149309 | 58.39127743137336 | 57.75348826659636 | 63.51857837670784 |
| 60.93118471250295 | 56.18794313826427 | 59.90371921039798 | 70.90571090756639 | 59.90371921039799 | 60.18845136725305 | 58.74941758577928 | 56.27912647342032 | 59.49280637693726 | 68.07903678656973 | 61.06211157690892 |
| 76.71460502773323 | 74.60791526520244 | 77.01586403920632 | 78.76647294908977 | 77.01586403920633 | 78.36451916888484 | 75.85582688468787 | 79.6189699637842 | 79.32032739708747 | 74.96273579988532 | 77.22431005347678 |
| 53.64652918239666 | 52.73419836446335 | 53.792238914395 | 50.69232280079197 | 53.79223891439501 | 44.28439204082524 | 52.63998569331193 | 51.61115777534754 | 58.39127743137336 | 52.01707242216671 | 52.36014135394667 |
| 62.14529396752066 | 63.09543268586608 | 62.34831132879917 | 55.18418682451962 | 62.348311328799184 | 67.00447679286498 | 59.97130396427276 | 58.613110822456704 | 69.40656688701236 | 64.63718727991194 | 62.47541818820234 |
| 51.21831067236123 | 55.03669488033063 | 51.34764679599381 | 57.43011883638344 | 51.34764679599382 | 49.96441322883517 | 52.63998569331193 | 50.44416560082935 | 50.68057481242606 | 53.16435559105263 | 52.327391290751805 |
| 56.07474769243209 | 50.43170184859608 | 56.2368310327962 | 50.69232280079197 | 56.2368310327962 | 56.780438654447096 | 56.305644828792346 | 52.778149949865735 | 53.98516164911776 | 60.04805460436822 | 54.95698840940037 |
| 57.2888569474498 | 53.88544662239699 | 56.2368310327962 | 58.55308484231536 | 56.2368310327962 | 60.18845136725305 | 55.08375845029887 | 53.94514212438393 | 62.797393213628965 | 68.07903678656973 | 58.229483241988916 |
| 50.00420141734352 | 52.73419836446335 | 50.125350736793216 | 48.44639078892815 | 50.12535073679322 | 49.96441322883517 | 51.41809931481846 | 45.776196902756574 | 46.27445903017046 | 53.16435559105263 | 49.80330161119547 |
| 52.43241992737895 | 53.88544662239699 | 52.569942855194405 | 47.32342478299624 | 52.56994285519441 | 56.780438654447096 | 53.8618720718054 | 53.94514212438393 | 53.98516164911776 | 46.28065657773705 | 52.363444812065225 |
| 79.14282353776866 | 72.30541874933516 | 77.01586403920632 | 76.52054093722595 | 77.01586403920633 | 77.22851493128286 | 77.07771326318135 | 79.6189699637842 | 79.32032739708747 | 77.25730213765718 | 77.25033389957355 |
| 80.35693279278638 | 78.06166003900336 | 79.46045615760752 | 78.76647294908977 | 79.46045615760752 | 77.22851493128286 | 79.5214860201683 | 78.451977789266 | 87.03103001603478 | 74.96273579988532 | 79.33017226527319 |
| 75.50049577271552 | 75.75916352313608 | 74.57127192080513 | 69.78274490163447 | 74.57127192080515 | 73.82050221847689 | 74.6339405061944 | 74.95100126571141 | 70.50809583257626 | 72.66816946211347 | 73.67666573241688 |
| 57.2888569474498 | 58.490439654131535 | 58.681423151197386 | 64.16791487197492 | 58.68142315119739 | 56.780438654447096 | 58.74941758577928 | 58.613110822456704 | 58.39127743137336 | 47.427939746622975 | 57.72722420166305 |
| 87.64158832289266 | 94.17913565007424 | 89.23882463121228 | 87.75020099654506 | 89.2388246312123 | 85.18054459449677 | 89.29657704811606 | 91.28889170896612 | 91.43714579829036 | 84.14100115097277 | 88.93927345327788 |
| 56.07474769243209 | 59.64168791206517 | 56.2368310327962 | 63.044948866043 | 56.2368310327962 | 54.50843017924312 | 56.305644828792346 | 53.94514212438393 | 66.10198005032066 | 48.57522291550891 | 57.067146663438166 |
| 87.64158832289266 | 86.1203978445388 | 86.79423251281109 | 84.38130297874932 | 86.7942325128111 | 82.90853611929279 | 88.07469066962258 | 85.45393083637515 | 81.52338528821528 | 79.55186847542905 | 84.92441655607378 |
| 50.00420141734352 | 57.3391913961979 | 50.125350736793216 | 55.18418682451962 | 50.12535073679322 | 47.6924047536312 | 50.19621293632499 | 50.44416560082935 | 60.594335322501166 | 49.72250608439484 | 52.142790580932896 |
| 37.863108867166375 | 40.07046752719336 | 37.902390144787255 | 39.462662741472855 | 37.90239014478726 | 35.19635814000934 | 37.97734915139028 | 38.77424385564741 | 62.797393213628965 | 35.95510805776367 | 40.39014718438467 |
| 71.85816800766237 | 72.30541874933516 | 72.12667980240394 | 72.0286769134983 | 72.12667980240396 | 69.27648526806895 | 72.19016774920746 | 73.78400909119323 | 68.30503794144846 | 66.93175361768381 | 71.09330769429057 |
| 62.14529396752066 | 64.24668094379972 | 63.57060738799977 | 65.29088087790683 | 63.57060738799978 | 65.86847255526298 | 62.4150767212597 | 62.11408734601128 | 63.898922159192864 | 57.75348826659636 | 63.087411761355 |
| 54.86063843741437 | 53.88544662239699 | 51.34764679599381 | 57.43011883638344 | 51.34764679599382 | 51.10041746643716 | 51.41809931481846 | 53.94514212438393 | 52.88363270355386 | 47.427939746622975 | 52.564672884399876 |
| 63.359403222538376 | 64.24668094379972 | 62.34831132879917 | 65.29088087790683 | 62.348311328799184 | 68.14048103046696 | 63.63696309975317 | 60.94709517149309 | 61.695864268065066 | 56.60620509771043 | 62.8620196369332 |
| 62.14529396752066 | 60.79293616999881 | 59.90371921039798 | 60.79901685417918 | 59.90371921039799 | 57.91644289204908 | 59.97130396427276 | 55.11213429890212 | 56.18821954024556 | 62.34262094214008 | 59.50754070501042 |
| 76.71460502773323 | 71.15417049140153 | 75.79356798000573 | 69.78274490163447 | 75.79356798000573 | 71.54849374327293 | 75.85582688468787 | 79.6189699637842 | 87.03103001603478 | 74.96273579988532 | 75.82557127884458 |
| 68.21584024260923 | 66.54917745966699 | 69.68208768400275 | 68.65977889570256 | 69.68208768400275 | 65.86847255526298 | 72.19016774920746 | 78.451977789266 | 67.20350899588456 | 72.66816946211347 | 69.91712685177188 |
| 79.14282353776866 | 78.06166003900336 | 78.23816009840692 | 69.78274490163447 | 78.23816009840692 | 71.54849374327293 | 78.29959964167483 | 80.78596213830238 | 77.11726950595967 | 82.99371798208685 | 77.4208591686517 |
| 45.14776439727266 | 46.97795707479518 | 44.01387044079023 | 48.44639078892815 | 44.01387044079024 | 42.01238356562126 | 46.53055380084457 | 45.776196902756574 | 52.88363270355386 | 49.72250608439484 | 46.552512619974756 |
| 81.57104204780408 | 83.81790132867152 | 83.1273443352093 | 82.1353709668855 | 83.12734433520932 | 87.45255306970074 | 83.18714515564871 | 79.6189699637842 | 78.21879845152357 | 85.2882843198587 | 82.75447539742956 |
| 71.85816800766237 | 74.60791526520244 | 72.12667980240394 | 73.15164291943022 | 72.12667980240396 | 68.14048103046696 | 72.19016774920746 | 65.61506386956586 | 81.52338528821528 | 71.52088629322753 | 72.2861070027786 |
| 32.0 | 36.61672275339245 | 32.0 | 34.97079871774521 | 31.79090984878428 | 32.92434966480537 | 33.089803637416395 | 34.10627515757464 | 37.46222746565925 | 34.80782488887773 | 33.97689121342553 |
| 71.85816800766237 | 76.91041178106971 | 70.90438374320334 | 73.15164291943022 | 70.90438374320335 | 70.41248950567093 | 70.968281370714 | 69.11604039312044 | 76.01574056039577 | 66.93175361768381 | 71.7173295642154 |
| 39.07721812218409 | 36.61672275339245 | 39.12468620398785 | 34.97079871774521 | 39.12468620398786 | 37.46836661521331 | 39.19923552988375 | 39.941236030165605 | 45.17293008460656 | 39.396957564421456 | 39.00928378255882 |
| 43.93365514225495 | 40.07046752719336 | 42.79157438158964 | 43.9545267652005 | 42.79157438158965 | 46.556400516029214 | 44.086781043857634 | 42.275220379202 | 45.17293008460656 | 40.54424073330739 | 43.21773709548309 |
| 68.21584024260923 | 67.70042571760062 | 68.45979162480215 | 64.16791487197492 | 68.45979162480216 | 67.00447679286498 | 67.30262223523359 | 64.44807169504767 | 61.695864268065066 | 66.93175361768381 | 66.43865526906842 |
| 74.2863865176978 | 71.15417049140153 | 74.57127192080513 | 64.16791487197492 | 74.57127192080515 | 76.09251069368086 | 72.19016774920746 | 71.45002474215683 | 73.81268266926797 | 79.55186847542905 | 73.18482700524268 |
| 82.7851513028218 | 78.06166003900336 | 83.1273443352093 | 84.38130297874932 | 83.12734433520932 | 77.22851493128286 | 84.40903153414217 | 79.6189699637842 | 74.91421161483187 | 91.02470016428836 | 81.86782311993224 |
| 50.00420141734352 | 51.58295010652972 | 51.34764679599381 | 48.44639078892815 | 51.34764679599382 | 53.37242594164113 | 51.41809931481846 | 46.943189077274766 | 60.594335322501166 | 54.31163875993856 | 51.936852432096316 |
| 67.00173098759151 | 65.39792920173335 | 68.45979162480215 | 65.29088087790683 | 68.45979162480216 | 67.00447679286498 | 64.85884947824664 | 69.11604039312044 | 59.49280637693726 | 62.34262094214008 | 65.74249183001453 |
| 63.359403222538376 | 61.94418442793244 | 64.79290344720036 | 68.65977889570256 | 64.79290344720037 | 63.596464080059015 | 63.63696309975317 | 69.11604039312044 | 73.81268266926797 | 72.66816946211347 | 66.63794931448882 |
| 71.85816800766237 | 70.0029222334679 | 73.34897586160454 | 73.15164291943022 | 73.34897586160454 | 72.68449798087491 | 74.6339405061944 | 76.11799344022961 | 59.49280637693726 | 76.11001896877126 | 72.07499421567768 |
| 68.21584024260923 | 70.0029222334679 | 69.68208768400275 | 67.53681288977064 | 69.68208768400275 | 74.95650645607888 | 68.52450861372705 | 70.28303256763864 | 74.91421161483187 | 77.25730213765718 | 71.1055312123787 |
| 46.36187365229037 | 52.73419836446335 | 48.90305467759261 | 46.20045877706433 | 48.90305467759263 | 53.37242594164113 | 47.752440179338045 | 52.778149949865735 | 50.68057481242606 | 54.31163875993856 | 50.19978697922129 |
| 70.64405875264467 | 72.30541874933516 | 69.68208768400275 | 79.88943895502169 | 69.68208768400275 | 65.86847255526298 | 69.74639499222053 | 67.94904821860226 | 67.20350899588456 | 63.489904111026014 | 69.64604206980034 |
| 73.07227726268009 | 71.15417049140153 | 75.79356798000573 | 68.65977889570256 | 75.79356798000573 | 70.41248950567093 | 74.6339405061944 | 76.11799344022961 | 76.01574056039577 | 73.81545263099939 | 73.54689792532858 |
| 32.0 | 27.406736689923363 | 32.0 | 32.72486670588138 | 31.79090984878428 | 29.516336951999406 | 29.424144501935984 | 30.60529863402005 | 36.36069852009536 | 30.0 | 31.182899185263985 |
| 88.85569757791038 | 89.5741426183397 | 86.79423251281109 | 82.1353709668855 | 86.7942325128111 | 82.90853611929279 | 88.07469066962258 | 81.95295431282058 | 82.62491423377918 | 79.55186847542905 | 84.9266639999702 |
| 50.00420141734352 | 57.3391913961979 | 50.125350736793216 | 54.06122081858771 | 50.12535073679322 | 48.82840899123319 | 51.41809931481846 | 50.44416560082935 | 55.08669059468166 | 45.13337340885112 | 51.256605301612936 |
| 60.93118471250295 | 61.94418442793244 | 62.34831132879917 | 61.92198286011109 | 62.348311328799184 | 59.05244712965106 | 62.4150767212597 | 63.28107952052948 | 60.594335322501166 | 54.31163875993856 | 60.914855211202486 |
| 65.7876217325738 | 78.06166003900336 | 68.45979162480215 | 61.92198286011109 | 68.45979162480216 | 63.596464080059015 | 68.52450861372705 | 72.61701691667503 | 79.32032739708747 | 64.63718727991194 | 69.13863521687531 |
| 64.5735124775561 | 64.24668094379972 | 64.79290344720036 | 65.29088087790683 | 64.79290344720037 | 65.86847255526298 | 64.85884947824664 | 64.44807169504767 | 63.898922159192864 | 57.75348826659636 | 64.05246853480101 |
| 54.86063843741437 | 53.88544662239699 | 55.0145349735956 | 48.44639078892815 | 55.01453497359561 | 56.780438654447096 | 53.8618720718054 | 52.778149949865735 | 49.57904586686216 | 61.19533777325415 | 54.141639011216526 |
| 65.7876217325738 | 65.39792920173335 | 64.79290344720036 | 67.53681288977064 | 64.79290344720037 | 65.86847255526298 | 62.4150767212597 | 62.11408734601128 | 67.20350899588456 | 68.07903678656973 | 65.39883531234669 |
| 58.50296620246752 | 60.79293616999881 | 58.681423151197386 | 57.43011883638344 | 58.68142315119739 | 63.596464080059015 | 59.97130396427276 | 57.44611864793851 | 52.88363270355386 | 62.34262094214008 | 59.03290078492089 |
| 56.07474769243209 | 49.28045359066245 | 57.45912709199679 | 49.56935679486006 | 57.4591270919968 | 57.91644289204908 | 56.305644828792346 | 59.7801029969749 | 58.39127743137336 | 57.75348826659636 | 55.99897686777342 |
| 73.07227726268009 | 76.91041178106971 | 74.57127192080513 | 69.78274490163447 | 74.57127192080515 | 76.09251069368086 | 74.6339405061944 | 70.28303256763864 | 76.01574056039577 | 71.52088629322753 | 73.74540884081318 |
| 53.64652918239666 | 53.88544662239699 | 55.0145349735956 | 55.18418682451962 | 55.01453497359561 | 51.10041746643716 | 53.8618720718054 | 46.943189077274766 | 57.28974848580946 | 62.34262094214008 | 54.42830806199714 |
| 43.93365514225495 | 41.221715785127 | 44.01387044079023 | 49.56935679486006 | 44.01387044079024 | 48.82840899123319 | 44.086781043857634 | 43.44221255372018 | 46.27445903017046 | 52.01707242216671 | 45.74014026449707 |
| 47.57598290730809 | 48.129205332728816 | 45.23616649999083 | 36.09376472367712 | 45.23616649999084 | 46.556400516029214 | 45.30866742235111 | 41.1082282046838 | 52.88363270355386 | 46.28065657773705 | 45.440887138805074 |
| 70.64405875264467 | 70.0029222334679 | 70.90438374320334 | 64.16791487197492 | 70.90438374320335 | 77.22851493128286 | 69.74639499222053 | 67.94904821860226 | 80.42185634265137 | 65.78447044879788 | 70.7753948278049 |
| 54.86063843741437 | 55.03669488033063 | 53.792238914395 | 60.79901685417918 | 53.79223891439501 | 49.96441322883517 | 52.63998569331193 | 49.27717342631115 | 55.08669059468166 | 60.04805460436822 | 54.52971455482223 |
| 67.00173098759151 | 64.24668094379972 | 67.23749556560156 | 59.676050848247264 | 67.23749556560156 | 65.86847255526298 | 66.08073585674012 | 67.94904821860226 | 74.91421161483187 | 70.3736031243416 | 67.05855252806205 |
| 73.07227726268009 | 76.91041178106971 | 73.34897586160454 | 67.53681288977064 | 73.34897586160454 | 77.22851493128286 | 72.19016774920746 | 69.11604039312044 | 76.01574056039577 | 73.81545263099939 | 73.25833699217354 |
| 54.86063843741437 | 53.88544662239699 | 53.792238914395 | 51.815288806723885 | 53.79223891439501 | 59.05244712965106 | 55.08375845029887 | 62.11408734601128 | 48.47751692129826 | 53.16435559105263 | 54.60380171336374 |

### 获奖结果

最终获奖情况如下：

获一等奖的组为：
  
第69组，得分89.45204275698605
  
第151组，得分88.93927345327788
  
第134组，得分86.04991061838611
  
第15组，得分85.05440514858631
  
第183组，得分84.9266639999702
  
第153组，得分84.92441655607378
  
第5组，得分84.81167891420571
  
第61组，得分82.98460948941845
  
第165组，得分82.75447539742956
  
第83组，得分81.97797268546626
  
第173组，得分81.86782311993224
  
第148组，得分79.33017226527319
  
第98组，得分78.53440376183383
  
第10组，得分78.1396204196094
  
第163组，得分77.4208591686517
  
第147组，得分77.25033389957355
  
第139组，得分77.22431005347678
  
第89组，得分76.79239831255157
  
第161组，得分75.82557127884458
  
第101组，得分74.91813502140437
  
获二等奖的组为：
  
第65组，得分74.84871711919979
  
第25组，得分74.14387310670755
  
第8组，得分74.1209583705734
  
第192组，得分73.74540884081318
  
第149组，得分73.67666573241688
  
第181组，得分73.54689792532858
  
第7组，得分73.43732507850831
  
第199组，得分73.25833699217354
  
第172组，得分73.18482700524268
  
第48组，得分72.75822388413002
  
第166组，得分72.2861070027786
  
第132组，得分72.09367040955381
  
第177组，得分72.07499421567768
  
第100组，得分71.88605116725782
  
第168组，得分71.7173295642154
  
第129组，得分71.41132925529902
  
第122组，得分71.40768921259418
  
第178组，得分71.1055312123787
  
第156组，得分71.09330769429057
  
第76组，得分70.98154244305127
  
第102组，得分70.82369321503347
  
第196组，得分70.7753948278049
  
第81组，得分70.57291095433524
  
第121组，得分70.1589485323026
  
第90组，得分69.94405404633913
  
第162组，得分69.91712685177188
  
第180组，得分69.64604206980034
  
第91组，得分69.49886975460124
  
第115组，得分69.45562306425163
  
第94组，得分69.22565258148249
  
获三等奖的组为：
  
第27组，得分68.32238268817862
  
第87组，得分68.13482991396522
  
第41组，得分68.01299989992371
  
第128组，得分67.78370241971274
  
第113组，得分67.73986757496517
  
第97组，得分67.33253432330164
  
第42组，得分67.2010977879061
  
第198组，得分67.05855252806205
  
第49组，得分66.73164781571225
  
第176组，得分66.63794931448882
  
第171组，得分66.43865526906842
  
第62组，得分66.30723121843536
  
第46组，得分66.29501152138089
  
第2组，得分66.05392537824821
  
第68组，得分66.00766628506396
  
第21组，得分65.8763592928166
  
第175组，得分65.74249183001453
  
第103组，得分65.52078242708284
  
第189组，得分65.39883531234669
  
第70组，得分65.18141233899088
  
第75组，得分65.09632133703548
  
第35组，得分65.09007668954861
  
第104组，得分64.99060993610053
  
第123组，得分64.92576366087346
  
第86组，得分64.88045198928906
  
第14组，得分64.72974099851305
  
第95组，得分64.64847282504584
  
第24组，得分64.44552400524725
  
第187组，得分64.05246853480101
  
第17组，得分64.03494490039523
  
第71组，得分63.83821130410786
  
第19组，得分63.827645033804345
  
第137组，得分63.51857837670784
  
第54组，得分63.51489498883624
  
第114组，得分63.44875635481168
  
第28组，得分63.331047844461935
  
第124组，得分63.21015552466213
  
第88组，得分63.181659228071055
  
第157组，得分63.087411761355
  
第159组，得分62.8620196369332
  
第136组，得分62.75022438398626
  
第79组，得分62.71442200592664
  
第119组，得分62.69594299504693
  
第133组，得分62.526170680153314
  
第141组，得分62.47541818820234
  
第34组，得分62.32818972975366
  
第110组，得分62.23126449633846
  
第58组，得分61.64143116201667
  
第55组，得分61.46693547976238