

Theory of Stats II - Small Project

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1 Set-up

1.1 Designing the Experiment

This experiment was designed to determine the difference in means of starting pitchers versus relief pitchers. The speed of every pitch was tracked as given from the screen in the ballpark (which only gives the speed in integers). The data was collected at the first two home games of the Pittsburgh Pirates where they faced the St. Louis Cardinals on April 1 and April 3.

1.2 Labeling

X_{1i} is the speed of the i th pitch by a starting pitcher for $i = 1, 2, \dots, n_1 = 352$
 X_{2j} is the speed of the j th pitch by a relief pitcher for $j = 1, 2, \dots, n_2 = 424$

1.3 Distributional Assumptions

$X_{11}, X_{12}, \dots, X_{1352}$ are i.i.d. with $EX_{1i} = \mu_1$ and $\text{Var } X_{1i} = \sigma_1^2 > 0$.

$X_{21}, X_{22}, \dots, X_{2424}$ are i.i.d. with $EX_{2j} = \mu_2$ and $\text{Var } X_{2j} = \sigma_2^2 > 0$.

The X_{1i} 's are independent of the X_{2j} 's.

The variances σ_1^2 and σ_2^2 are unknown.

The means μ_1 and μ_2 are unknown.

1.4 Parameter to be estimated

The difference in the population means $\mu_1 - \mu_2$.

2 Random Sampling

The speeds of every pitch from the first two Pittsburgh Pirates home games of the 2019 season was recorded. The Pirates played the St. Louis Cardinals and went into extra innings in both games. During the two games, every relief pitcher on the roster of both teams was used. Thus, there were only 6 starting pitchers from both teams combined that no data was recorded for. This experiment could have been designed to include all of the starting pitchers so that starting pitchers were represented more. If all hitters had no weaknesses or had the same weakness, the mean pitch speed would not have differentiated between hitters. Another source of weakness is that the pitch speed display only displayed the speed in integers. If there were at least one decimal place on the display, the data would be more accurate. This data also only includes two teams in the National League, where pitchers are allowed to hit. Normally, these pitchers are not very good, so the pitches can vary more than those against position players who train themselves more on hitting. Were we to sample from an American League game as well, the samples would have more randomness.

3 Statistical Theory

3.1 Point Estimate

The difference in the sample means $\widehat{\mu_1 - \mu_2} = \hat{\mu}_1 - \hat{\mu}_2 = \bar{X}_1 - \bar{X}_2$.

3.2 Pivot Statistic

$$Z = \frac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}} = \frac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{S_1^2}{352} + \frac{S_2^2}{424}}} \stackrel{\text{approx}}{\sim} N(0, 1).$$

3.3 (1- α)100% Confidence Interval

$$\begin{aligned} 1 - \alpha &= P(|Z| \leq z_{\alpha/2}) = P\left(\left| \frac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}} \right| \leq z_{\alpha/2}\right) = \\ &P(-z_{\alpha/2} \leq \frac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}} \leq z_{\alpha/2}) = \\ &P((\bar{X}_1 - \bar{X}_2) - z_{\alpha/2} \cdot \sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}} \leq \mu_1 - \mu_2 \leq (\bar{X}_1 - \bar{X}_2) + z_{\alpha/2} \cdot \sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}). \end{aligned}$$

Thus the (1- α) 100% Confidence Interval is $(\bar{X}_1 - \bar{X}_2) \pm z_{\alpha/2} \cdot \sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}$.

4 Computations

The pages at the end of this document include the computations as given from Mathematica used below. It also includes all of the raw data captured during the games in an Excel Spreadsheet.

4.1 Point Estimate

$$\widehat{\mu_1 - \mu_2} = \hat{\mu}_1 - \hat{\mu}_2 = \bar{X}_1 - \bar{X}_2 = 86.625 - 88.9764 = -2.3514.$$

$$Z = \frac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{S_1^2}{352} + \frac{S_2^2}{424}}} = \frac{(86.625 - 88.9764) - (\mu_1 - \mu_2)}{\sqrt{\frac{6.33412}{352} + \frac{5.95884}{424}}} = \frac{-2.3514 - (\mu_1 - \mu_2)}{\sqrt{.17902}}$$

4.2 95% Confidence Interval

$$\begin{aligned} (\bar{X}_1 - \bar{X}_2) \pm z_{\alpha/2} \cdot \sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}} &= (86.625 - 88.9764) \pm z_{.025} \cdot \sqrt{\frac{6.33412}{352} + \frac{5.95884}{424}} = \\ -2.3514 \pm 1.960 \cdot 0.17902 &= [-2.7023, -2.0005] \end{aligned}$$

5 Conclusion

This experiment has taught me that relief pitchers throw faster than starting pitchers. The 95% confidence interval shows that the relief pitchers throw a little more than 2 miles per hour faster on average than starting pitchers. Also this project taught me that relief pitchers throw more consistently higher speed pitches as their standard deviation was about .4 miles an hour higher. This confirmed that since relief pitchers only come in for a short time, they can throw faster and not worry about the stress as much as starting pitchers.

```
In[3]:= StartingPitchers = {89, 79, 91, 83, 91, 91, 84, 92, 92, 86, 87, 92, 91, 92, 84, 92, 92, 93, 91,
86, 86, 90, 91, 91, 85, 92, 97, 86, 84, 91, 85, 85, 92, 85, 91, 84, 91, 87, 90, 91, 86, 91,
83, 92, 85, 87, 92, 92, 87, 86, 93, 88, 88, 86, 86, 93, 85, 86, 93, 93, 87, 86, 83, 85, 91,
85, 91, 91, 90, 91, 85, 85, 93, 87, 87, 90, 86, 86, 86, 91, 85, 86, 85, 92, 87, 86, 88, 93,
86, 86, 85, 93, 93, 93, 93, 87, 87, 87, 87, 86, 84, 87, 85, 83, 72, 88, 84, 75, 90, 77,
90, 73, 87, 72, 88, 82, 74, 82, 84, 73, 90, 87, 75, 74, 84, 89, 89, 74, 76, 75, 90, 77,
86, 80, 71, 78, 85, 70, 74, 88, 71, 71, 79, 71, 70, 86, 81, 85, 73, 82, 74, 87, 71, 83,
79, 86, 83, 79, 76, 75, 80, 86, 89, 86, 69, 81, 72, 74, 74, 83, 84, 94, 94, 88, 82, 94,
89, 95, 94, 89, 94, 93, 81, 94, 93, 88, 93, 89, 89, 90, 93, 88, 83, 89, 87, 87, 94, 94,
87, 87, 89, 95, 88, 89, 89, 96, 95, 93, 80, 80, 93, 94, 95, 89, 93, 87, 95, 80, 88, 87,
88, 81, 93, 80, 93, 87, 82, 92, 93, 95, 92, 87, 80, 93, 92, 88, 88, 81, 86, 93, 94, 92,
88, 93, 93, 94, 89, 89, 95, 90, 82, 90, 89, 93, 88, 90, 92, 77, 92, 94, 84, 91, 92, 77,
94, 78, 85, 76, 93, 92, 92, 76, 86, 85, 93, 92, 87, 93, 92, 93, 77, 86, 87, 93, 88, 85,
93, 77, 93, 77, 93, 79, 94, 94, 86, 78, 92, 92, 77, 77, 76, 93, 78, 92, 78, 76, 85, 86,
93, 78, 86, 94, 86, 94, 85, 76, 77, 91, 91, 92, 91, 93, 93, 92, 78, 85, 93, 92, 93, 84,
77, 92, 86, 86, 93, 93, 77, 91, 94, 85, 76, 93, 93, 93, 79, 94, 85, 92, 94, 93, 77, 77};
```

```
In[35]:= N[Variance[StartingPitchers]]
s1 = N[StandardDeviation[StartingPitchers]]
OverBar[x1] = N[Mean[StartingPitchers]]
n1 = Length[StartingPitchers]
```

Out[35]= 40.1211

Out[36]= 6.33412

Out[37]= 86.625

Out[38]= 352

```
ReliefPitchers = {94, 94, 80, 79, 79, 94, 94, 92, 93, 80, 94, 79, 91, 80, 90, 91, 91, 92, 91,
  93, 92, 93, 81, 92, 91, 90, 91, 91, 78, 91, 92, 93, 88, 88, 88, 96, 81, 96, 96, 81,
  82, 83, 90, 95, 95, 79, 81, 95, 96, 81, 81, 95, 96, 96, 81, 96, 81, 88, 87, 90, 96, 96,
  89, 88, 96, 88, 89, 87, 88, 95, 89, 97, 96, 98, 87, 96, 80, 87, 88, 86, 98, 96, 86, 98,
  88, 84, 86, 97, 86, 96, 97, 83, 85, 96, 80, 87, 87, 88, 97, 97, 96, 85, 82, 93, 82, 81,
  83, 85, 93, 85, 92, 92, 92, 81, 92, 81, 83, 92, 81, 83, 83, 84, 83, 84, 92, 85, 81, 90,
  92, 91, 82, 82, 93, 84, 91, 90, 90, 90, 92, 93, 83, 93, 83, 94, 81, 83, 94, 82, 95,
  94, 93, 94, 93, 82, 93, 92, 93, 85, 82, 92, 81, 80, 79, 92, 94, 80, 92, 87, 81, 81,
  93, 87, 88, 92, 88, 91, 91, 91, 91, 83, 82, 82, 83, 82, 93, 92, 83, 82, 83, 82, 91,
  91, 83, 92, 81, 82, 93, 89, 83, 83, 84, 91, 75, 82, 92, 89, 83, 81, 83, 83, 83, 92, 93,
  92, 83, 88, 87, 86, 99, 100, 101, 100, 87, 85, 96, 85, 99, 98, 100, 97, 87, 83, 99,
  99, 85, 83, 90, 99, 87, 86, 99, 99, 100, 87, 99, 99, 76, 82, 94, 76, 94, 83, 95, 94,
  87, 75, 94, 94, 89, 95, 95, 94, 78, 94, 95, 79, 78, 78, 78, 90, 96, 96, 95, 95, 82, 81,
  95, 80, 95, 79, 95, 95, 95, 81, 95, 80, 83, 81, 94, 94, 94, 94, 94, 94, 80, 81, 93, 81,
  81, 83, 82, 85, 94, 94, 96, 87, 86, 87, 93, 94, 85, 86, 95, 85, 88, 84, 93, 88, 93,
  86, 85, 85, 85, 92, 84, 92, 85, 93, 86, 92, 92, 93, 80, 93, 88, 88, 92, 93, 92, 92,
  92, 93, 94, 88, 77, 85, 94, 86, 95, 85, 77, 95, 95, 86, 95, 76, 85, 96, 85, 85, 95,
  95, 92, 85, 84, 95, 94, 94, 86, 86, 94, 85, 82, 84, 93, 94, 82, 84, 93, 92, 93, 94,
  93, 82, 95, 96, 82, 94, 94, 81, 82, 94, 93, 74, 94, 94, 95, 82, 94, 96, 97, 88, 87,
  87, 96, 88, 97, 96, 89, 90, 85, 89, 95, 88, 95, 88, 95, 95, 95, 89, 95, 94, 94, 95};
```

```
In[31]:= N[Variance[ReliefPitchers]]
s2 = N[StandardDeviation[ReliefPitchers]]
OverBar[x2] = N[Mean[ReliefPitchers]]
n2 = Length[ReliefPitchers]
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Out[31]= 35.5077
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Out[32]= 5.95884
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Out[33]= 88.9764
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Out[34]= 424
```


Pitcher Name: Archer			Pitcher Name: Crook			Pitcher Name: Rodriguez			Pitcher Name: Lirio			Pitcher Name: Kels			Pitcher Name: Burti			Pitcher Name: Vazquez			Pitcher Name: Braut			Pitcher Name: Kingham		
Speed	Lefty/Righty Batter	Ball/Strike	Speed	Lefty/Righty Batter	Ball/Strike	Speed	Lefty/Righty Batter	Ball/Strike	Speed	Lefty/Righty Batter	Ball/Strike	Speed	Lefty/Righty Batter	Ball/Strike	Speed	Lefty/Righty Batter	Ball/Strike	Speed	Lefty/Righty Batter	Ball/Strike	Speed	Lefty/Righty Batter	Ball/Strike	Speed	Lefty/Righty Batter	Ball/Strike
1	89 Lefty	S		84 Righty	B		93 Lefty	S		93 Lefty	S		96 Righty	S		88 Righty	S		97 Lefty	B		82 Lefty	S		93 Righty	B
2	79 Lefty	S-7		94 Righty	S		80 Lefty	B		92 Lefty	B		82 Righty	S		87 Righty	B		96 Lefty	S		93 Lefty	B		90 Righty	S
3	91 Lefty	B		80 Righty	B		90 Lefty	S		93 Lefty	S		96 Righty	B		90 Righty	S		98 Lefty	S		82 Lefty	S		90 Righty	B
4	83 Lefty	B		79 Righty	S		93 Lefty	S		88 Lefty	B		96 Righty	B		96 Lefty	S		87 Lefty	S		83 Lefty	S		90 Righty	B
5	91 Lefty	S		79 Righty	B		93 Lefty	S		88 Lefty	S		82 Righty	B		96 Lefty	B		96 Righty	B		83 Lefty	S		92 Righty	B
6	91 Lefty	B		94 Righty	S		92 Lefty	S		88 Lefty	B		82 Righty	S		89 Lefty	S		80 Righty	S		85 Righty	B			
7	84 Lefty	S		94 Righty	S		93 Righty	S		93 Righty	S		83 Righty	B		88 Lefty	S		87 Righty	S		93 Righty	B			
8	92 Righty	B		92 Righty	B		93 Righty	B		90 Righty	B		90 Righty	B		96 Righty	S		88 Righty	B		85 Righty	B			
9	92 Righty	B		93 Righty	S		92 Righty	B		95 Righty	S		88 Righty	S		88 Righty	S		86 Righty	S		92 Righty	S			
10	86 Righty	S		80 Righty	S		93 Righty	S		95 Righty	B		89 Righty	S		89 Righty	S		96 Righty	S		92 Righty	B			
11	87 Righty	B		94 Righty	B		81 Righty	B		79 Righty	S		87 Righty	S		87 Righty	S		96 Righty	S		92 Righty	B			
12	92 Righty	S		79 Righty	S		81 Righty	S		81 Righty	S		86 Righty	B		86 Righty	B		86 Righty	B		81 Righty	S			
13	93 Righty	S		92 Righty	S		92 Righty	S		95 Righty	B		95 Righty	B		95 Righty	B		98 Righty	S		92 Righty	S			
14	92 Righty	B		90 Righty	S		90 Righty	S		96 Righty	S		86 Righty	S		89 Righty	S		88 Righty	S		81 Lefty	S			
15	86 Righty	S		91 Righty	B		91 Righty	B		81 Righty	S		81 Righty	S		84 Righty	B		84 Righty	B		83 Lefty	B			
16	92 Righty	S		92 Righty	S		92 Righty	S		82 Righty	S		82 Righty	S		85 Righty	S		85 Righty	S		92 Lefty	B			
17	92 Righty	S		78 Righty	S					95 Righty	S		95 Righty	S		97 Righty	S		97 Righty	S		81 Lefty	S			
18	91 Righty	B								96 Righty	S		96 Righty	S		86 Righty	B		86 Righty	B		83 Lefty	S			
19	91 Righty	B								96 Righty	B		96 Righty	B		96 Righty	S		86 Righty	S		83 Righty	B			
20	86 Righty	S								81 Righty	S		81 Righty	S		97 Righty	S		97 Righty	S		84 Righty	S			
21	86 Righty	S								96 Righty	B		96 Righty	B		83 Righty	B		83 Righty	B		83 Righty	S			
22	90 Righty	S								81 Righty	S		81 Righty	S		85 Righty	S		85 Righty	S		84 Righty	S			
23	91 Righty	B													96 Righty	S		96 Righty	S		92 Righty	S				
24	91 Righty	S													80 Righty	S		80 Righty	S		85 Righty	B				
25	85 Righty	S													87 Righty	S		87 Righty	S		81 Righty	B				
26	92 Lefty	S													87 Righty	S		87 Righty	S		90 Righty	B				
27	97 Lefty	B													88 Righty	B		88 Righty	B		92 Righty	S				
28	86 Lefty	S													97 Righty	S		97 Righty	S		93 Righty	B				
29	84 Lefty	B													97 Righty	S		97 Righty	S		82 Righty	B				
30	91 Lefty	S													96 Righty	S		96 Righty	S		82 Righty	S				
31	95 Lefty	B													85 Righty	S		85 Righty	S		93 Righty	B				
32	85 Lefty	S																			84 Righty	B				
33	92 Lefty	B																								
34	80 Lefty	B																								
35	91 Righty	B																								
36	84 Righty	S																								
37	91 Righty	S																								
38	87 Righty	S																								
39	90 Righty	B																								
40	91 Righty	S																								
41	86 Righty	B																								
42	91 Righty	S																								
43	83 Righty	B																								
44	92 Righty	B																								
45	85 Lefty	S																								
46	87 Lefty	B																								
47	92 Lefty	S																								
48	92 Lefty	S																								
49	87 Lefty	S																								
50	86 Righty	S																								
51	93 Righty	S																								
52	88 Righty	B																								
53	89 Righty	S																								
54	86 Righty	S																								
55	86 Righty	S																								
56	84 Righty	B																								
57	85 Righty	S																								
58	86 Righty	S																								
59	91 Righty	B																								
60	93 Righty	B																								
61	87 Righty	S																								
62	86 Righty	S																								
63	83 Righty	S																								
64	85 Righty	B																								
65	81 Righty	S																								
66	85 Lefty	B																								
67	91 Lefty	B																								
68	91 Lefty	B																								
69	90 Lefty	S																								
70	91 Lefty	S																								
71	90 Lefty	S																								
72	85 Righty	S																								
73	93 Righty	B																								
74	87 Righty	S																								
75	87 Righty	B																								
76	90 Righty	S																								
77	86 Righty	B																								
78	86 Righty	B																								
79	86 Righty	S																								
80	91 Lefty	B																								
81	85 Lefty	S																								
82	86 Lefty	S																								
83	85 Lefty	S																								
84	92 Lefty	B																								
85	87 Lefty	S																								
86	86 Lefty	S																								
87	88 Lefty	S																								
88	93 Lefty	S																								
89	86 Lefty	B																								
90	86 Lefty	B																								
91	85 Lefty	S																								
92	93 Righty	S																								
93	93 Righty	B																								

Pitcher Name: Wainwright			Pitcher Name: Brebbia			Pitcher Name: Leone			Pitcher Name: Miller			Pitcher Name: Mayers			Pitcher Name: Hicks			Pitcher Name: Gant		
Speed	Lefty/Righty Batter	Ball/Strike	Speed	Lefty/Righty Batter	Ball/Strike	Speed	Lefty/Righty Batter	Ball/Strike	Speed	Lefty/Righty Batter	Ball/Strike	Speed	Lefty/Righty Batter	Ball/Strike	Speed	Lefty/Righty Batter	Ball/Strike	Speed	Lefty/Righty Batter	Ball/Strike
1	86 Lefty	B	93 Righty	S		92 Lefty	S		82 Lefty	S		83 Righty	B		83 Lefty	S		76 Lefty	S	
2	84 Lefty	B	83 Lefty	S		87 Lefty	S		82 Lefty	B		82 Righty	B		88 Lefty	B		82 Lefty	S	
3	87 Lefty	B	93 Lefty	S		81 Lefty	S		82 Lefty	S ?		91 Righty	B		87 Lefty	S		94 Lefty	S	
4	85 Lefty	A	83 Lefty	S		81 Lefty	S		83 Lefty	B		91 Righty	S		86 Lefty	B		76 Lefty	B	
5	83 Lefty	B	94 Lefty	B		93 Lefty	S		82 Lefty	B		83 Righty	S		99 Lefty	S		94 Lefty	B	
6	72 Righty	B	81 Lefty	B		87 Lefty	S		93 Lefty	B		92 Righty	S		100 Lefty	B		83 Lefty	B	
7	88 Righty	B	83 Lefty	S		88 Lefty	B		92 Righty	B		81 Lefty	S		101 Lefty	S		95 Lefty	B	
8	84 Righty	S	94 Lefty	S		92 Lefty	S		83 Righty	B		82 Lefty	B		100 Lefty	S		94 Righty	B	
9	75 Righty	S	82 Lefty	B		88 Lefty	S		82 Righty	B		93 Lefty	S		87 Lefty	S		87 Righty	S	
10	90 Righty	S	95 Lefty	S		91 Lefty	S					89 Righty	S		85 Lefty	B		75 Righty	S	
11	77 Righty	B	94 Lefty	S		91 Righty	S					83 Righty	S		96 Lefty	B		94 Righty	B	
12	90 Righty	B	93 Righty	S		91 Righty	S					83 Righty	B		85 Lefty	B		94 Righty	S	
13	73 Lefty	B	94 Righty	S		91 Righty	S					84 Righty	S		99 Lefty	B				
14	67 Righty	B	93 Righty	B								91 Righty	S		98 Righty	B				
15	72 Lefty	S	82 Righty	B								75 Lefty	B		100 Righty	S				
16	88 Lefty	S ?	93 Righty	B								82 Lefty	S		97 Lefty	S				
17	82 Lefty	B	92 Righty	S								92 Lefty	B		87 Lefty	B				
18	74 Lefty	S	93 Lefty	B								89 Lefty	B		83 Lefty	S				
19	82 Lefty	B	85 Lefty	B								83 Lefty	S		99 Lefty	B				
20	84 Lefty	B	82 Lefty	S								81 Lefty	S		99 Lefty	B				
21	73 Lefty	S	92 Lefty	B								83 Righty	S		85 Lefty	S				
22	90 Lefty	S	81 Lefty	B								83 Righty	B		83 Righty	S				
23	87 Righty	B	80 Righty	S								83 Righty	B		90 Righty	S				
24	75 Righty	B	79 Righty	S								92 Righty	S		99 Righty	S				
25	74 Righty	B	92 Righty	B								93 Righty	B		87 Righty	S				
26	84 Righty	S	94 Righty	S								92 Righty	S		86 Righty	B				
27	89 Righty	B	80 Righty	S											99 Righty	B				
28	89 Lefty	S													99 Righty	S				
29	74 Righty	S													100 Righty	S				
30	76 Righty	B													87 Righty	B				
31	75 Righty	S													99 Righty	S				
32	90 Righty	B													99 Righty	S				

	Pitcher Name: Taillon			Pitcher Name: Kela			Pitcher Name: Crick			Pitcher Name: Burdi			Pitcher Name: Liriano		
	Speed	Lefty/Righty Batter	Ball/Strike	Speed	Lefty/Righty Batter	Ball/Strike	Speed	Lefty/Righty Batter	Ball/Strike	Speed	Lefty/Righty Batter	Ball/Strike	Speed	Lefty/Righty Batter	Ball/Strike
1	94	Lefty	S	89	Lefty	B	83	Righty	B	85	Lefty	S	93	Lefty	S
2	94	Lefty	B	95	Lefty	B	81	Righty	B	94	Lefty	B	86	Righty	B
3	88	Lefty	S	95	Lefty	B	94	Righty	S	94	Lefty	S	85	Righty	B
4	82	Lefty	S	94	Lefty	B	94	Righty	S	96	Lefty	S	85	Righty	B
5	94	Righty	S	78	Righty	B	94	Righty	B	87	Lefty	B	85	Righty	B
6	89	Righty	S	94	Righty	S	94	Righty	S	86	Lefty	S	92	Righty	B
7	95	Righty	B	95	Righty	S	94	Righty	S	87	Lefty	S	84	Righty	B
8	94	Righty	S	79	Righty	B	94	Righty	S	93	Righty	B	92	Righty	S
9	89	Righty	B	78	Righty	S	80	Righty	S	94	Righty	B	85	Righty	S
10	94	Righty	S	78	Lefty	B	81	Righty	S	85	Righty	S	93	Righty	S
11	93	Righty	S	78	Lefty	S	93	Righty	S	86	Righty	S	86	Righty	S
12	81	Righty	S	90	Lefty	B	81	Righty	S	95	Righty	B	92	Righty	S
13	94	Righty	S	96	Lefty	S	81	Righty	B	85	Righty	S	92	Righty	S
14	93	Lefty	S	96	Righty	S	83	Righty	S	88	Righty	B			
15	88	Lefty	B	95	Righty	S	82	Righty	S	84	Righty	S			
16	93	Lefty	S	95	Righty	S				93	Righty	B			
17	89	Lefty	S	82	Righty	B				88	Righty	S			
18	89	Lefty	B	81	Righty	B									
19	90	Lefty	S	95	Righty	S									
20	93	Lefty	B	80	Righty	S									
21	88	Lefty	S	95	Righty	S									
22	83	Lefty	B	79	Righty	B									
23	89	Lefty	S	95	Righty	S									
24	87	Righty	S	95	Righty	S									
25	87	Righty	B	95	Righty	B									
26	94	Righty	S	81	Righty	B									
27	94	Righty	S	95	Righty	S									
28	87	Righty	S	80	Righty	S									
29	87	Lefty	S												
30	89	Lefty	S												
31	95	Lefty	B												
32	88	Lefty	B												
33	89	Lefty	B												
34	89	Lefty	S												
35	96	Lefty	S												
36	95	Righty	S												
37	93	Righty	B												
38	80	Righty	S												
39	80	Righty	S												
40	93	Righty	B												
41	94	Righty	S												
42	95	Righty	S												
43	89	Righty	S												
44	93	Righty	S												
45	87	Righty	S												
46	95	Righty	S												
47	80	Lefty	S												
48	88	Lefty	B												
49	87	Lefty	S												
50	88	Lefty	B												
51	81	Lefty	B												
52	93	Lefty	S												
53	80	Lefty	S												
54	93	Lefty	B												
55	87	Lefty	S												
56	82	Righty	S												
57	92	Righty	B												
58	93	Righty	S												
59	95	Righty	S												
60	92	Lefty	B												
61	87	Lefty	S												
62	80	Lefty	S												
63	93	Lefty	B												
64	92	Lefty	S												
65	88	Righty	S												
66	88	Righty	B												
67	81	Righty	B												
68	86	Righty	B												
69	93	Righty	S												
70	94	Righty	S												
71	92	Righty	B												
72	88	Righty	S												
73	93	Righty	S												
74	93	Righty	B												
75	94	Righty	S												
76	89	Righty	S												
77	89	Righty	B												
78	95	Righty	S												
79	90	Righty	S												
80	82	Righty	S												
81	90	Lefty	B												
82	89	Lefty	S												
83	93	Lefty	B												
84	88	Lefty	S												
85	90	Lefty	S												

[illegible]