```
<< LinearAlgebra`GaussianElimination`
```

```
<< DiscreteMath`Combinatorica`
```

```
HDS = Import["C:\FruitJuiceData\HDS58TwoScores.txt", "Table"]
```

```
{{3.46792, -0.4184}, {2.6878, 0.03638}, {2.22352, -0.96181}, {1.22042, -1.66639},
 {1.93336, -1.25065}, {2.14273, -1.88236}, {0.78093, -0.97976}, {-0.13922, -0.53418},
 {-1.8084, -0.85716}, {-0.78023, 1.2457}, {-0.89167, 0.61274}, {-3.91192, -0.39028},
 {-3.36732, -1.07574}, {-4.12941, -1.0816}, {-3.98326, -0.43421},
 {1.69646, -1.67391}, {2.53893, 1.38633}, {2.55311, 1.06623}, {3.41195, 0.643},
 {1.98358, -1.09254}, {3.79083, 0.53323}, {3.0921, 3.60501}, {0.75395, 1.86733},
 {0.23564, -2.00509}, {0.23232, 4.82085}, {-0.23225, -0.27314}, {-0.92849, 2.3154},
 {-2.27088, -0.07306}, {-2.66321, 0.28243}, {-1.85711, 0.66043},
 {-2.54427, -0.64998}, {-2.5779, 0.11942}, {-2.13457, 1.48178}, {-2.71887, -0.10865},
 {-2.49429, -1.91268}, {-4.00086, -0.02451}, {2.51508, -0.909}, {2.06417, -1.73098},
 {2.29071, 0.4324}, {0.64918, -0.1571}, {0.87162, 1.28944}, {-1.74798, 0.12536},
 {-3.14314, 2.51097}, {-2.9219, -2.19461}, {1.08557, -2.62926}, {-0.5061, 0.81301},
 {-0.96837, 1.2288}, {2.54391, -0.00787}, {3.52917, 0.75169}, {2.80737, -0.75255},
 {0.97592, -2.10716}, {0.50745, -0.93399}, {0.79964, 2.16618}, {-1.72357, -0.30998},
 {-2.71192, 0.97669}, {1.75972, -2.40465}, {0.13202, 0.46315}, {-0.11994, 2.04935}}
```

```
MatrixForm[HDS]
```

$$\begin{pmatrix}
3.46792 & -0.4184 \\
2.6878 & 0.03638 \\
2.22352 & -0.96181 \\
1.22042 & -1.66639 \\
1.93336 & -1.25065 \\
2.14273 & -1.88236 \\
0.78093 & -0.97976 \\
-0.13922 & -0.53418 \\
-1.8084 & -0.85716 \\
-0.78023 & 1.2457 \\
-0.89167 & 0.61274 \\
-3.91192 & -0.39028 \\
-3.36732 & -1.07574 \\
-4.12941 & -1.0816 \\
-3.98326 & -0.43421 \\
1.69646 & -1.67391 \\
2.53893 & 1.38633 \\
2.55311 & 1.06623 \\
3.41195 & 0.643 \\
1.98358 & -1.09254 \\
3.79083 & 0.53323 \\
3.0921 & 3.60501 \\
0.75395 & 1.86733 \\
0.23564 & -2.00509 \\
0.23232 & 4.82085 \\
-0.23225 & -0.27314 \\
-0.92849 & 2.3154 \\
-2.27088 & -0.07306 \\
-2.66321 & 0.28243 \\
-1.85711 & 0.66043 \\
-2.54427 & -0.64998 \\
-2.5779 & 0.11942
\end{pmatrix}$$

```
| -2.5779   0.11942 |
| -2.13457  1.48178 |
| -2.71887 -0.10865 |
| -2.49429 -1.91268 |
| -4.00086 -0.02451 |
|  2.51508  -0.909  |
|  2.06417 -1.73098 |
|  2.29071  0.4324  |
|  0.64918 -0.1571  |
|  0.87162  1.28944 |
| -1.74798  0.12536 |
| -3.14314  2.51097 |
|  -2.9219 -2.19461 |
|  1.08557 -2.62926 |
|  -0.5061  0.81301 |
| -0.96837  1.2288  |
|  2.54391 -0.00787 |
|  3.52917  0.75169 |
|  2.80737 -0.75255 |
|  0.97592 -2.10716 |
|  0.50745 -0.93399 |
|  0.79964  2.16618 |
| -1.72357 -0.30998 |
| -2.71192  0.97669 |
|  1.75972 -2.40465 |
|  0.13202  0.46315 |
| -0.11994  2.04935 |
```

```
theSDs = HDS;; Let[t = KSubsets[theSDs, 3]]; ;
For[j = 1, j < 59, j++, Let[{{l, m}} = Take[theSDs, {j}];;
  testpoint = {l, m}; ; totalindic = 0; ; For[i = 1, i < 30857, i++,
   Let[{{x, y, z}} = Take[t, {i}], X = ((1 1 1; x y z));; Clear[a, b, c]; ; {{a, b, c}} =
     {a, b, c} /. Solve[{a + b + c == 1, a * x + b * y + c * z == testpoint}, {a, b, c}]; ;
    If[{a > 0, b > 0, c > 0} == {True, True, True}, {indic = 1, answer = inside}, {indic = 0,
      answer = outside}]; ; totalindic = totalindic + indic; ; SD = totalindic / 30856 ]]; ;
  Print["SD", j, " is ", SD, " = ", N[SD]];; f[j] = N[SD]]; ;
Export["C:\FruitJuiceData\HDS58PC2.xls",
 {Table[f[k], {k, j - 1}]}, "Table"]
```

```
SD1 is 0 = 0.

SD2 is 1095/15428 = 0.0709749

SD3 is 1215/15428 = 0.0787529

SD4 is 613/7714 = 0.0794659

SD5 is 3197/30856 = 0.10361

SD6 is 55/30856 = 0.00178247

SD7 is 789/4408 = 0.178993
```

SD8 is $\frac{6753}{30856} = 0.218855$

SD9 is $\frac{3519}{30856} = 0.114046$

SD10 is $\frac{62}{551} = 0.112523$

SD11 is $\frac{5991}{30856} = 0.19416$

SD12 is $\frac{8}{551} = 0.0145191$

SD13 is $\frac{683}{30856} = 0.0221351$

SD14 is $\frac{1}{30856} = 0.0000324086$

SD15 is $\frac{1}{532} = 0.0018797$

SD16 is $\frac{1969}{30856} = 0.0638125$

SD17 is $\frac{1175}{30856} = 0.0380801$

SD18 is $\frac{1255}{30856} = 0.0406728$

SD19 is $\frac{961}{30856} = 0.0311447$

SD20 is $\frac{3095}{30856} = 0.100305$

SD21 is $\frac{1}{15428} = 0.0000648172$

SD22 is $\frac{1}{30856} = 0.0000324086$

SD23 is $\frac{2111}{30856} = 0.0684146$

SD24 is $\frac{191}{7714} = 0.0247602$

SD25 is $\frac{25}{30856} = 0.000810215$

SD26 is $\frac{927}{3857} = 0.240342$

SD27 is $\frac{51}{2204} = 0.0231397$

SD28 is $\frac{2153}{15428} = 0.139551$

SD29 is $\frac{2195}{30856} = 0.0711369$

SD30 is $\frac{47}{406} = 0.115764$

SD31 is $\frac{3007}{30856} = 0.0974527$

SD32 is $\frac{2843}{30856} = 0.0921377$

SD33 is $\frac{243}{7714} = 0.0315012$

SD34 is $\frac{2923}{30856}$ = 0.0947304

SD35 is $\frac{45}{1624}$ = 0.0277094

SD36 is $\frac{1}{3857}$ = 0.000259269

SD37 is $\frac{639}{15428}$ = 0.0414182

SD38 is $\frac{18}{551}$ = 0.0326679

SD39 is $\frac{527}{4408}$ = 0.119555

SD40 is $\frac{3613}{15428}$ = 0.234185

SD41 is $\frac{3547}{30856}$ = 0.114953

SD42 is $\frac{5725}{30856}$ = 0.185539

SD43 is $\frac{11}{3857}$ = 0.00285196

SD44 is $\frac{5}{15428}$ = 0.000324086

SD45 is $\frac{11}{15428}$ = 0.000712989

SD46 is $\frac{5673}{30856}$ = 0.183854

SD47 is $\frac{3111}{30856}$ = 0.100823

SD48 is $\frac{1451}{15428}$ = 0.0940498

SD49 is $\frac{125}{30856}$ = 0.00405108

SD50 is $\frac{303}{15428}$ = 0.0196396

SD51 is $\frac{1129}{30856}$ = 0.0365893

SD52 is $\frac{5753}{30856}$ = 0.186447

SD53 is $\frac{617}{15428}$ = 0.0399922

SD54 is $\frac{2789}{15428}$ = 0.180775

SD55 is $\frac{367}{15428}$ = 0.0237879

SD56 is $\frac{1}{812}$ = 0.00123153

SD57 is $\frac{6681}{30856}$ = 0.216522

SD58 is $\frac{9}{232}$ = 0.0387931

C:\FruitJuiceData\HDS58PC2.xls