```
In [24]:
               from scipy.stats import spearmanr, pearsonr
In [25]:
               import pandas as pd
           H
               df = pd.read_csv ('Ant16Data.csv')
               df.head()
    Out[25]:
                                                      COMP
                                                                 LOC
                                                                          WMC
                                                                                      DIT
                                                                                               NO
                  org.apache.tools.ant.taskdefs.XSLTLoggerAware....
                                                             -0.730244 -0.896416
                                                                                 -0.584162
                                                                                          -0.14639
               1
                        org.apache.tools.ant.taskdefs.Recorder.java -0.235684
                                                                       -0.205915
                                                                                 0.722329 -0.14639
               2
                     org.apache.tools.ant.util.facade.Implementatio... -0.674519 -0.723791
                                                                                 0.722329 0.24178
               3
                                 org.apache.tools.bzip2.CRC.java 1.779710 -0.378540 -0.584162 -0.14639
               4
                     org.apache.tools.ant.taskdefs.optional.depend.... -0.477159 -0.378540 -1.237407 -0.14639
               5 rows × 22 columns
In [26]:
               cdf=df.corr(method ='spearman')
               cdf.to_excel("Ant16_CorrCoef.xlsx")
               #scipy.stats.spearmanr(nan_policy='omit')
In [27]:
               def spearmanr_pval(x,y):
                   return spearmanr(x,y)[1]
               pdf=df.corr(method=spearmanr_pval)
In [28]:
               pdf.to_excel("Ant16_corrP.xlsx")
```

```
5 Pairwise Correlation Analysis - Jupyter Notebook
                   import matplotlib.pyplot as plt
In [29]:
                   import seaborn as sns
                   import numpy as np
                   #work withowt *
                   sns.set(rc = {'figure.figsize':(17,8)})
                   corr = df.corr(method = 'spearman')
                   np.ones(corr.shape)
                   np.tril(np.ones(corr.shape))
                   np.tril(np.ones(corr.shape)).astype(bool)
                   lower_triang_df = corr.where(np.tril(np.ones(corr.shape)).astype(bool))
                   sns.heatmap(lower_triang_df,annot = True, annot_kws={"size":13}, cmap="F
                   #to solve the bug of cutoff top and bottom
                   b, t = plt.ylim() # discover the values for bottom and top
                   b += 0.5 # Add 0.5 to the bottom
                   t -= 0.5 # Subtract 0.5 from the top
                   plt.ylim(b, t) # update the ylim(bottom, top) values
                   plt.savefig('Ant16_Corr_Matrix.png')
                        LOC
                        WMC
                        DIT
                        NOC
                                   0.14 0.29
                        CBO
                        RFC
                                    0.13 0.012
                                    -0.065 0.13 0.41
                                0.049 0.028 0.39 0.37
                         CA
                                    0.15 0.081
                        CE
                        NPM
                            0.69 0.92 0.089 0.062 0.47 0.73 0.68 0.07 0.49
                      LCOM3
                                -0.14 -0.11 -0.044 0.063
                                                   0.25 0.045 -0.026 -0
                        DAM 0.39 0.42 0.19 0.079 0.14 0.36 0.08 -0.085 0.26 0.41
                        MOA 0.4 0.41 0.22 0.1 0.38 0.42 0.27 0.095 0.39 0.36 -0.11 0.29
                        MFA 0.036 -0.098 0.87 0.052 0.075 0.047 -0.17 -0.15 0.19 -0.063-0.068 0.13 0.098
                        CAM -0.74 -0.83 -0.11 -0.1 -0.51 -0.78 -0.66 -0.14 -0.54 -0.74 0.12
                                     0.64 <mark>-0.088</mark> 0.16 0.26 0.012 <mark>-0.11</mark> 0.22 0.18
                                                                                                                         -0.4
                            AMC 0.76 0.31 0.16 -0.15 0.24 0.66 0.18 -0.24 0.49 0.18 -0.17 0.22 0.23 0.16 CC 0.56 0.42 0.088 -0.012 0.28 0.54 0.31 0.086 0.32 0.33 -0.11 0.16 0.23 -0.021
                                                                                        0.18 0.19
                     MaX_CC 0.68 0.59 0.084 0.019 0.37 0.66 0.46 0.066 0.44 0.49 0.083 0.22 0.28 0.039 0.55
                                                                                       0.19 0.2 0.49
                            0.2 0.19 0.12 <mark>0.01</mark> 0.13 0.22 0.14 <del>0.068</del> 0.2 0.17 <del>0.032</del> 0.063 0.13 0.074 <del>0.18</del> 0.093 0.094 0.16 0.16
                                    DIT NOC CBO
```

```
In [30]:
          # #from scipy.stats import spearmanr
             # from scipy.stats.mstats import spearmanr
             \# coef, p = spearmanr(df["IC"], df["CA"])
             # print(coef)
             # print(p)
```

In []: