In [13]:
```
import pandas as pd
import numpy as np
import igraph
import networkx as nx
import matplotlib.pyplot as plt
# from networkx.algorithms.community import greedy_modularity_communitie
s
# from networkx.algorithms import community
# from community import community_louvain
import community
```

In [14]:
```
data = pd.read_csv('GOTFollowerEdgeList.csv')
G = nx.Graph()
for i in data.index:
    u = str(data['source'][i])
    v = str(data['target'][i])
    G.add_edge(u, v)
```

In [15]:
```
def detectCommunities(G_fb, layout):

    parts = community.best_partition(G_fb)
    values = [parts.get(node) for node in G_fb.nodes()]

    figsize = (20, 20)
    fig = plt.figure(figsize=figsize)
#     ax = fig.add_subplot(1, 1, 1)

    plt.axis("off")
    nx.draw_networkx(G_fb, pos = layout,
                     cmap = plt.get_cmap("jet"),
                     node_color = values,
                     node_size = 400,
                     with_labels = True
                    )
    plt.savefig("communities.png", format = "PNG")
    return parts
```

In [16]:
```
spring_pos = nx.spring_layout(G, k = 0.3)
parts = detectCommunities(G, spring_pos)
```

In [17]:
```
parts
```

```
Out[17]: {'ASOlAFdany': 7,
          'AnaMevaS': 4,
          'BayAlden': 0,
          'BettyRHelton1': 1,
          'Bledenmark': 11,
          'BotafogoBoy': 0,
          'Celticdream1989': 15,
          'DICELookAss': 14,
          'DeliaCCastro1': 1,
          'Digno1994': 13,
          'DireJackalope': 2,
          'ExilianOfficial': 0,
          'Factable': 6,
          'FanFestNews': 5,
          'FansOfBOB': 5,
          'FemalePains': 6,
          'FirstWorldPains': 6,
          'GamerFoxem': 10,
          'GothamiteClaire': 5,
          'Gr33nHand': 14,
          'HarperVoyagerUK': 5,
          'Jhaqual': 12,
          'KVMFinn': 2,
          'Keirseydotcom': 5,
          'KevinHert4Real': 3,
          'LaughTale77': 9,
          'LoriWCox1': 1,
          'LsgMx2': 4,
          'MFrizqi': 3,
          'Obijuan_cube': 12,
          'PeggyRJones1': 1,
          'QueenDarklina': 7,
          'RarePopFacts': 3,
          'RealOwinoPaul': 8,
          'RebeccaCann23': 5,
          'SHIELD221287': 5,
          'SelfPubShowcase': 0,
          'ShokoofehR': 2,
          'Spider_Gina': 15,
          'TajSwallah': 8,
          'TheGamingGround': 10,
          'TshirtPainter': 0,
          'WesterosCraft': 14,
          'ZombieLeader1': 5,
          '_DCWorld': 5,
          'abakaroooona': 13,
          'angela_willi010': 1,
          'authorejamie': 0,
          'bleedingcool': 5,
          'bonniesrg': 5,
          'cafero91': 12,
          'casterlyrock8': 9,
          'clemmie_s': 16,
          'ebmom': 0,
          'gipsipink': 5,
          'lauravarnam': 2,
          'madmanmarz': 10,
          'medievalismish': 2,
          'mypurplebubble': 16,
          'omgthatspunny': 6,
          'razordawn_': 14,
          'sftme': 12,
          'trendchasernews': 6,
          'twinslion66': 9,
          'vrojas33172_v': 5,
          'zaldrizesse': 11}
```

In [18]:
```
type(parts)
```

Out[18]:
```
dict
```

In [19]:
```
dictlist=[]
for key, value in parts.items():
    temp = [key,value]
    dictlist.append(temp)
```

In [20]:
```
dictlist
```

```
Out[20]: [['TshirtPainter', 0],
          ['BayAlden', 0],
          ['angela_willi010', 1],
          ['BettyRHelton1', 1],
          ['lauravarnam', 2],
          ['KVMFinn', 2],
          ['medievalismish', 2],
          ['MFrizqi', 3],
          ['RarePopFacts', 3],
          ['AnaMevaS', 4],
          ['LsgMx2', 4],
          ['Keirseydotcom', 5],
          ['bleedingcool', 5],
          ['Factable', 6],
          ['trendchasernews', 6],
          ['QueenDarklina', 7],
          ['ASOlAFdany', 7],
          ['RealOwinoPaul', 8],
          ['TajSwallah', 8],
          ['LaughTale77', 9],
          ['casterlyrock8', 9],
          ['twinslion66', 9],
          ['madmanmarz', 10],
          ['TheGamingGround', 10],
          ['SelfPubShowcase', 0],
          ['authorejamie', 0],
          ['ExilianOfficial', 0],
          ['BotafogoBoy', 0],
          ['ebmom', 0],
          ['GamerFoxem', 10],
          ['Bledenmark', 11],
          ['zaldrizesse', 11],
          ['vrojas33172_v', 5],
          ['FanFestNews', 5],
          ['FirstWorldPains', 6],
          ['FansOfBOB', 5],
          ['ZombieLeader1', 5],
          ['Jhaqual', 12],
          ['Obijuan_cube', 12],
          ['cafero91', 12],
          ['bonniesrg', 5],
          ['HarperVoyagerUK', 5],
          ['DireJackalope', 2],
          ['ShokoofehR', 2],
          ['abakaroooona', 13],
          ['Digno1994', 13],
          ['omgthatspunny', 6],
          ['KevinHert4Real', 3],
          ['gipsipink', 5],
          ['_DCWorld', 5],
          ['sftme', 12],
          ['SHIELD221287', 5],
          ['razordawn_', 14],
          ['WesterosCraft', 14],
          ['DICELookAss', 14],
          ['RebeccaCann23', 5],
          ['GothamiteClaire', 5],
          ['Celticdream1989', 15],
          ['Spider_Gina', 15],
          ['Gr33nHand', 14],
          ['mypurplebubble', 16],
          ['clemmie_s', 16],
          ['LoriWCox1', 1],
          ['PeggyRJones1', 1],
          ['DeliaCCastro1', 1],
          ['FemalePains', 6]]
```

In [21]:
```
len(dictlist)
```

Out[21]: 66

In [22]:
```
ll=[]
for i in range(17):
    st=[]
    #print(i)
    for j in range(66):
        if i==dictlist[j][1] :
            st.append(dictlist[j][0])
    ll.append(st)
ll
```

Out[22]:
```
[['TshirtPainter',
  'BayAlden',
  'SelfPubShowcase',
  'authorejamie',
  'ExilianOfficial',
  'BotafogoBoy',
  'ebmom'],
 ['angela_willi010',
  'BettyRHelton1',
  'LoriWCox1',
  'PeggyRJones1',
  'DeliaCCastro1'],
 ['lauravarnam', 'KVMFinn', 'medievalismish', 'DireJackalope', 'Shokoofeh
R'],
 ['MFrizqi', 'RarePopFacts', 'KevinHert4Real'],
 ['AnaMevaS', 'LsgMx2'],
 ['Keirseydotcom',
  'bleedingcool',
  'vrojas33172_v',
  'FanFestNews',
  'FansOfBOB',
  'ZombieLeader1',
  'bonniesrg',
  'HarperVoyagerUK',
  'gipsipink',
  '_DCWorld',
  'SHIELD221287',
  'RebeccaCann23',
  'GothamiteClaire'],
 ['Factable',
  'trendchasernews',
  'FirstWorldPains',
  'omgthatspunny',
  'FemalePains'],
 ['QueenDarklina', 'ASOlAFdany'],
 ['RealOwinoPaul', 'TajSwallah'],
 ['LaughTale77', 'casterlyrock8', 'twinslion66'],
 ['madmanmarz', 'TheGamingGround', 'GamerFoxem'],
 ['Bledenmark', 'zaldrizesse'],
 ['Jhaqual', 'Obijuan_cube', 'cafero91', 'sftme'],
 ['abakaroooona', 'Digno1994'],
 ['razordawn_', 'WesterosCraft', 'DICELookAss', 'Gr33nHand'],
 ['Celticdream1989', 'Spider_Gina'],
 ['mypurplebubble', 'clemmie_s']]
```

In [23]:
```
twitter_data = pd.read_csv('stgot.csv')
print(twitter_data.shape)
print(twitter_data.head())
final=[]
```

```
(200, 8)
   Unnamed: 0              user_id    screen_name  \
0           0           x3041702170       brxvwndr
1           1  x1069638973943947268  RebeccaCann23
2           2           x1886897922    WOODStheMAV
3           3             x15807157      bucketree
4           4            x273119117      gipsipink

                                                text  Polarity Subjectivi
ty  \
0  #Domina\n\n🔴NOVEDAD🔴\n\nLa nueva serie de la A...   Neutral    Objec
tive
1  Available to pre order now.\nGame Of Thrones t...  Positive    Objecti
ve
2  She is savage in real life too. #GameofThrones...  Positive    Objecti
ve
3  Glad you have spoken out #EmiliaClark #mothero...  Positive   Subjecti
ve
4  Available to pre order now.\nGame Of Thrones t...  Positive    Objecti
ve

     Pval  Sval
0  0.0000  0.00
1  0.1875  0.45
2  0.2000  0.30
3  0.5000  1.00
4  0.1875  0.45
```

In [30]:
```
print(len(ll),len(ll[0]),twitter_data.shape[0])
print(twitter_data['screen_name'][9])
comc=len(ll)
```

```
17 7 200
DeliaCCastro1
```

In [31]:
```
comm_data=[]
for i in range(twitter_data.shape[0]):

    for j in range(len(ll)):
        for k in range(len(ll[j])):
            if ll[j][k]==twitter_data['screen_name'][i]:
                temp=j
    comm_data.append(temp)
len(comm_data)
```

Out[31]: 200

In [32]:
```
twitter_data['com']=comm_data
```

In [33]:
```
twitter_data
```

Out[33]:

	Unnamed: 0	user_id	screen_name	text	Polarity	Subj
0	0	x3041702170	brxvwndr	#Domina\n \n🔴NOVEDAD🔴 \n\nLa nueva serie de la A...	Neutral	Obje
1	1	x1069638973943947268	RebeccaCann23	Available to pre order now.\nGame Of Thrones t...	Positive	Obje
2	2	x1886897922	WOODStheMAV	She is savage in real life too. #GameofThrones...	Positive	Obje
3	3	x15807157	bucketree	Glad you have spoken out #EmiliaClark #mothero...	Positive	Subj
4	4	x273119117	gipsipink	Available to pre order now.\nGame Of Thrones t...	Positive	Obje
5	5	x3669495854	litsoni004	It was wonderful to meet Norwegian star #Krist...	Positive	Obje
6	6	x315109360	ksivananth	It was wonderful to meet Norwegian star #Krist...	Positive	Obje
7	7	x281756039	GothamiteClaire	Available to pre order now.\nGame Of Thrones t...	Positive	Obje
8	8	x931095544004411394	KushalS91764769	Chankya and Shakuni, Varys and Baelish, eat yo...	Neutral	Obje
9	9	x1184480893903265793	DeliaCCastro1	Pardon? Alternate Ending?! #GOT #GameofThrones...	Neutral	Obje
10	10	x1169667304210255872	LoriWCox1	Pardon? Alternate Ending?! #GOT #GameofThrones...	Neutral	Obje
11	11	x2629617610	_DCWorld	Available to pre order now.\nGame Of Thrones t...	Positive	Obje
12	12	x2629617610	_DCWorld	Live in 55 minutes with an ultra special unbox...	Positive	Obje
13	13	x2629617610	_DCWorld	LIVE.\nSpecial Unboxing of the new \nGame of T...	Positive	Obje
14	14	x1952616098	AmbersNewHandle	I've just watched the entire #GameofThrones se...	Positive	Obje

In [34]:
```
tw=twitter_data.sort_values(by='com')
tw
```

Out[34]:

	Unnamed: 0	user_id	screen_name	text	Polarity	S
87	87	x1107471787	liberty4humans	Check out #SPIA prof Ñusta Carranza Ko's new b...	Positive	C
109	109	x47012051	TshirtPainter	#GameOfThrones #Winterfell #Stark #Wolf graphi...	Negative	C
93	93	x57499236	BotafogoBoy	Game Of Thrones Series 5 Episode 10 Script. Le...	Negative	C
92	92	x2997380034	Utkarsh9777	There is nothing new in politics its always be...	Negative	S
91	91	x883142010	AMusicFresno	"Gotta spray this from many different angles t...	Positive	S
90	90	x272987850	targarstark_	HERE'S THE CUSTOM ROBB STARK FUNKO POP I GOT F...	Positive	S
89	89	x380263103	Oumyregina	Et dans la deuxième partie de ce pilote, nous ...	Neutral	C
88	88	x1885665241	GameOfLaughs	😂\n#GameOfThrones https://t.co/nc7xFWb0uD	Neutral	C
114	114	x2219771588	Reiji_666	"Gotta spray this from many different angles t...	Positive	S
113	113	x382336744	Ivana2804	BEST OF 2019 - Favorite Actress on TV Sci-Fi/F...	Positive	S
86	86	x487242586	RudyChe	Like for Jon 🐺 RT for Dany 🐉 #GameofThrones #d...	Neutral	C
85	85	x1920883334	ExilianOfficial	New #music on our YouTube channel! A new Dorni...	Positive	C
72	72	x836441477131689984	uma3666	It was wonderful to meet Norwegian star #Krist...	Positive	C
71	71	x16132244	ebmom	No matter who you are, no matter how strong yo...	Positive	C
112	112	x140476646	nysportstalk1	"Gotta spray this from many different angles t...	Positive	S
111	111	x786620065	nai_alt	Mientras veía la serie iba dibujando algunos p...	Neutral	C
142	142	x1449744306	SelfPubShowcase	"#GameofThrones meets #Dune" in #SciFi novel R...	Neutral	C
110	110	x1131802477634961408	WendyHerbert16	https://t.co/YX2Oi4eP9h\n#Motabhai #MaskSinger...	Neutral	C
24	24	x23862037	authorejamie	Hilal 1st GOT Watcher:	Negative	S

In [35]:
```
pm=np.zeros((comc,3))
sm=np.zeros((comc,2))
pmm=np.zeros(comc)
smm=np.zeros(comc)
for i in range(17):
    for k in range(tw.shape[0]):

        if tw['com'][k]==i and tw['Polarity'][k]=='Positive':
            pm[i][0]= pm[i][0]+1

        if tw['com'][k]==i and tw['Polarity'][k]=='Neutral':
            pm[i][1]= pm[i][1]+1
        if tw['com'][k]==i and tw['Polarity'][k]=='Negative':
            pm[i][2]= pm[i][2]+1

for i in range(17):
    for k in range(tw.shape[0]):
        if tw['com'][k]==i:
            pmm[i]=pmm[i]+tw['Pval'][k]
            smm[i]=smm[i]+tw['Sval'][k]
```

In [36]:
```
pm
```

Out[36]:
```
array([[  9.,   7.,   4.],
       [  0.,   6.,   0.],
       [  7.,  10.,   1.],
       [  0.,   5.,   0.],
       [  0.,   2.,   3.],
       [ 26.,   9.,   1.],
       [  2.,   9.,   2.],
       [  4.,   6.,   4.],
       [  4.,   2.,   0.],
       [  8.,   6.,   2.],
       [  4.,   4.,   1.],
       [  2.,   3.,   0.],
       [ 11.,   6.,   0.],
       [  2.,   1.,   0.],
       [  1.,   6.,   1.],
       [  4.,   4.,   0.],
       [  3.,   7.,   1.]])
```

In [37]:
```
for i in range(17):
    for k in range(tw.shape[0]):
        #smm[i]=smm[i]+tw['Sval'][k]
        if tw['com'][k]==i and tw['Subjectivity'][k]=='Subjective':
            sm[i][0]= sm[i][0]+1
        if tw['com'][k]==i and tw['Subjectivity'][k]=='Objective':
            sm[i][1]= sm[i][1]+1
sm
```

Out[37]:
```
array([[  7.,  13.],
       [  0.,   6.],
       [  3.,  15.],
       [  0.,   5.],
       [  1.,   4.],
       [ 11.,  25.],
       [  1.,  12.],
       [  2.,  12.],
       [  0.,   6.],
       [  2.,  14.],
       [  4.,   5.],
       [  0.,   5.],
       [  3.,  14.],
       [  2.,   1.],
       [  1.,   7.],
       [  2.,   6.],
       [  2.,   9.]])
```

In [38]:
```
pred_p=[]
pred_s=[]
pred_pv=[]
pred_sv=[]

for i in range(17):
    if pm[i][0]>=pm[i][1] and pm[i][0]>=pm[i][2]:
            pred_p.append('positive')
    if pm[i][1]>pm[i][0] and pm[i][1]>pm[i][2]:
            pred_p.append('neutral')
    if pm[i][2]>pm[i][0] and pm[i][2]>=pm[i][1]:
            pred_p.append('negative')


print(pred_p)


for i in range(17):
    if sm[i][0]>sm[i][1]:
            pred_s.append('subjective')
    else:
            pred_s.append('objective')

print(pred_s)
```

```
['positive', 'neutral', 'neutral', 'neutral', 'negative', 'positive', 'ne
utral', 'neutral', 'positive', 'positive', 'positive', 'neutral', 'positi
ve', 'positive', 'neutral', 'positive', 'neutral']
['objective', 'objective', 'objective', 'objective', 'objective', 'object
ive', 'objective', 'objective', 'objective', 'objective', 'objective', 'o
bjective', 'objective', 'subjective', 'objective', 'objective', 'objectiv
e']
```

In [39]:
```
#pmm=pm.sum(axis=1)
#print(pmm)
for i in range(17):
    pmm[i]=pmm[i]/len(ll[i])
    smm[i]=smm[i]/len(ll[i])
print(pmm)
print(smm)
```

```
[ 0.23219697  0.          0.47642857  0.         -0.19583333  0.58424992
  0.14       -0.16477273  0.22525253  0.72878788 -0.00333333  0.36666667
  1.21386364  0.5         0.0175      0.98333333  0.45677083]
[ 0.98376623  0.          0.96634524  0.          0.67083333  1.0473865
  0.29        1.90227273  0.5989899   1.25151515  1.00666667  0.4
  1.31204545  1.          0.25916667  1.30833333  1.03177083]
```

In [40]:
```
pred_pv=[]
pred_sv=[]
for i in pmm:
    if i >=-0.1 and i<=0.2:
        pred_pv.append('Neutral')
    elif i<0.0:
        pred_pv.append('Negative')
    else:
        pred_pv.append('Positive')

for i in smm:
    if i <0.5:
        pred_sv.append('subjective')
    else:
        pred_sv.append('objective')
```

In [41]:
```
print(pred_p)
print(pmm)
print(pred_pv)
```

```
['positive', 'neutral', 'neutral', 'neutral', 'negative', 'positive', 'ne
utral', 'neutral', 'positive', 'positive', 'positive', 'neutral', 'positi
ve', 'positive', 'neutral', 'positive', 'neutral']
[ 0.23219697  0.          0.47642857  0.         -0.19583333  0.58424992
  0.14       -0.16477273  0.22525253  0.72878788 -0.00333333  0.36666667
  1.21386364  0.5         0.0175      0.98333333  0.45677083]
['Positive', 'Neutral', 'Positive', 'Neutral', 'Negative', 'Positive', 'N
eutral', 'Negative', 'Positive', 'Positive', 'Neutral', 'Positive', 'Posi
tive', 'Positive', 'Neutral', 'Positive', 'Positive']
```

In [42]:
```
print(pred_s)
print(pred_sv)
```

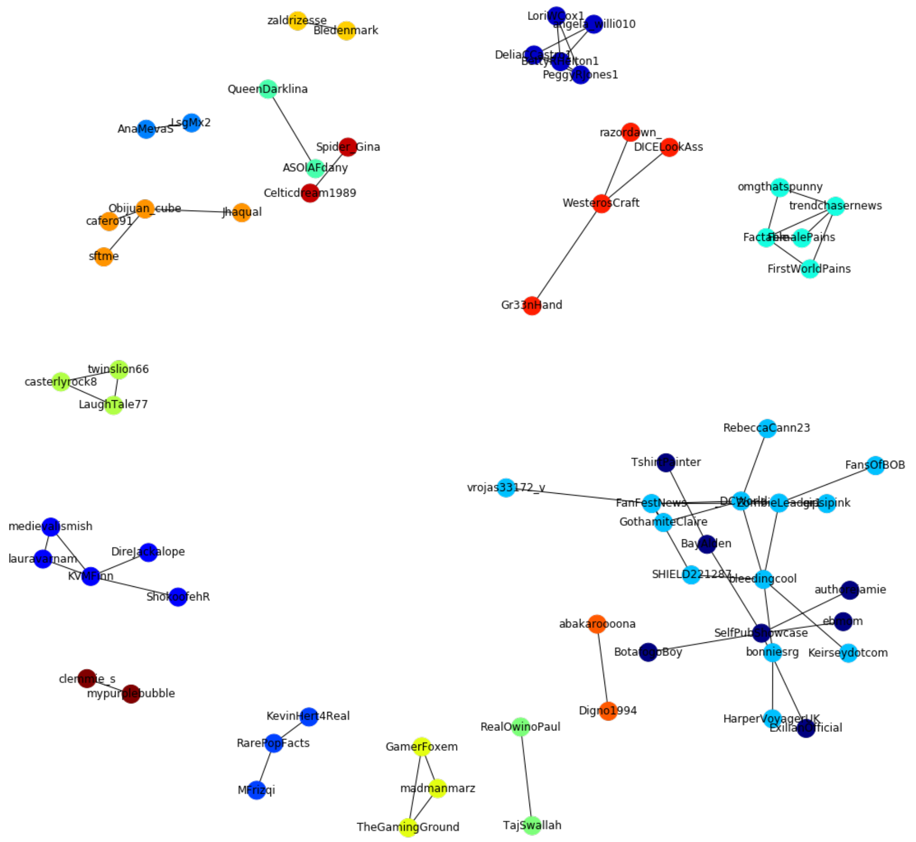
```
['objective', 'objective', 'objective', 'objective', 'objective', 'object
ive', 'objective', 'objective', 'objective', 'objective', 'objective', 'o
bjective', 'objective', 'subjective', 'objective', 'objective', 'objectiv
e']
['objective', 'subjective', 'objective', 'subjective', 'objective', 'obje
ctive', 'subjective', 'objective', 'objective', 'objective', 'objective',
'subjective', 'objective', 'objective', 'subjective', 'objective', 'objec
tive']
```

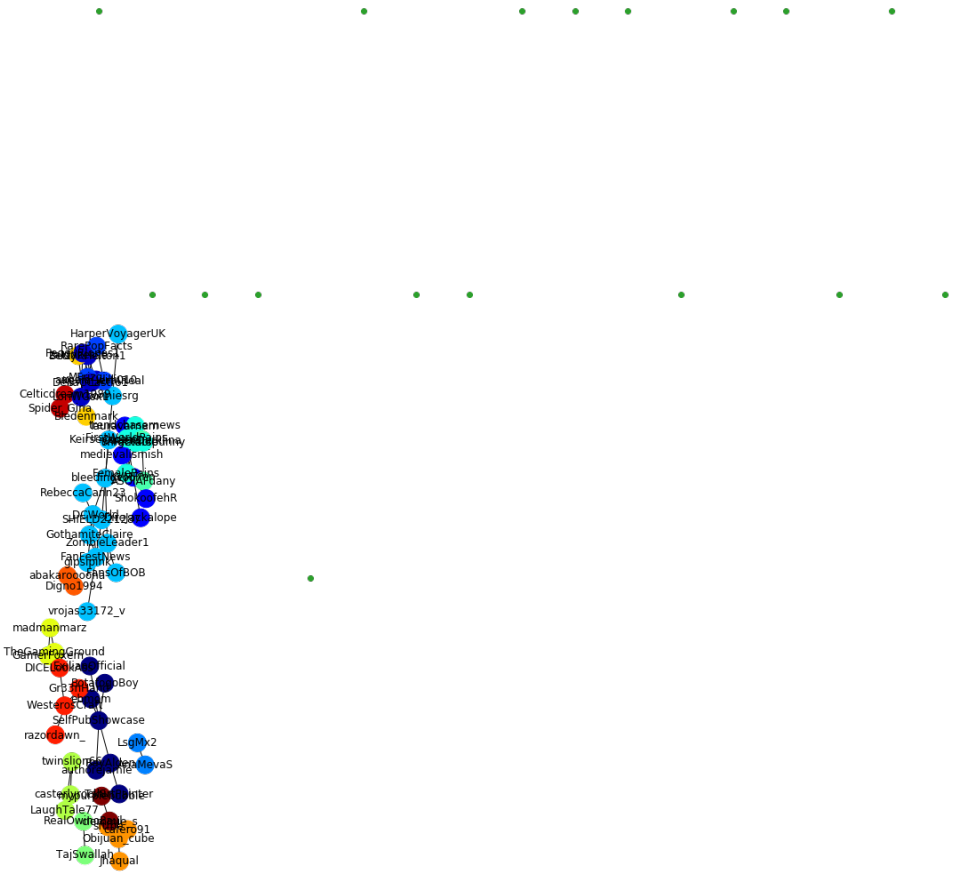
In [48]:
```
print('community             \tmax_pol\t\tcal_pol\t\tmax_sub\t\tcal_sub\
n')
li=[]
for i in range(17):
    li.append(i)
    print(i,'\t\t',pred_p[i],'\t\t',pred_pv[i],'\t\t',pred_s[i],'\t',pre
d_sv[i],'\n')
```

```
community               max_pol         cal_pol         max_sub         c
al_sub

0               positive                Positive                objectiv
e       objective

1               neutral                 Neutral                 objectiv
e       subjective

2               neutral                 Positive                objectiv
e       objective

3               neutral                 Neutral                 objectiv
e       subjective

4               negative                Negative                objectiv
e       objective

5               positive                Positive                objectiv
e       objective

6               neutral                 Neutral                 objectiv
e       subjective

7               neutral                 Negative                objectiv
e       objective

8               positive                Positive                objectiv
e       objective

9               positive                Positive                objectiv
e       objective

10              positive                Neutral                 objectiv
e       objective

11              neutral                 Positive                objectiv
e       subjective

12              positive                Positive                objectiv
e       objective

13              positive                Positive                subjecti
ve      objective

14              neutral                 Neutral                 objectiv
e       subjective

15              positive                Positive                objectiv
e       objective

16              neutral                 Positive                objectiv
e       objective
```

In [49]:
```
import matplotlib.pyplot as plt
print(len(li),len(pred_p))
# data = np.loadtxt('ex2data1.txt',delimiter=',')
plt.scatter(li,pred_p)
plt.show()
```

17 17


zaldrizesse
Bledenmark
QueenDarklina
AnaMeva5
LsgMx2
Spider_Gina
ASOIAFdany
Celticdream1989
Obijuan_cube
cafero91
jhaqual
sftme
razordawn_
DICELookAss
WesterosCraft
Gr33nHand
omgthatspunny
trendchasernews
FirstWorldPains
twinslion66
casterlyrock8
LaughTale77
RebeccaCann23
FansOfBOB
vrojas33172_v
FanFestNews
GothamiteClaire
SHIELD221287
bleedingcool
bonniesrg
Keirseydotcom
abakarooona
Digno1994
DireJackalope
KevinHert4Real
RarePopFacts
MFrizqi
GamerFoxem
madmanmarz
TheGamingGround
RealOwinoPaul
TajSwallah
mypurplebubble


HarperVoyagerUK
vrojas33172_v
madmanmarz
SelfPubShowcase
razordawn_
LaughTale77
TajSwallah
jjtaqual