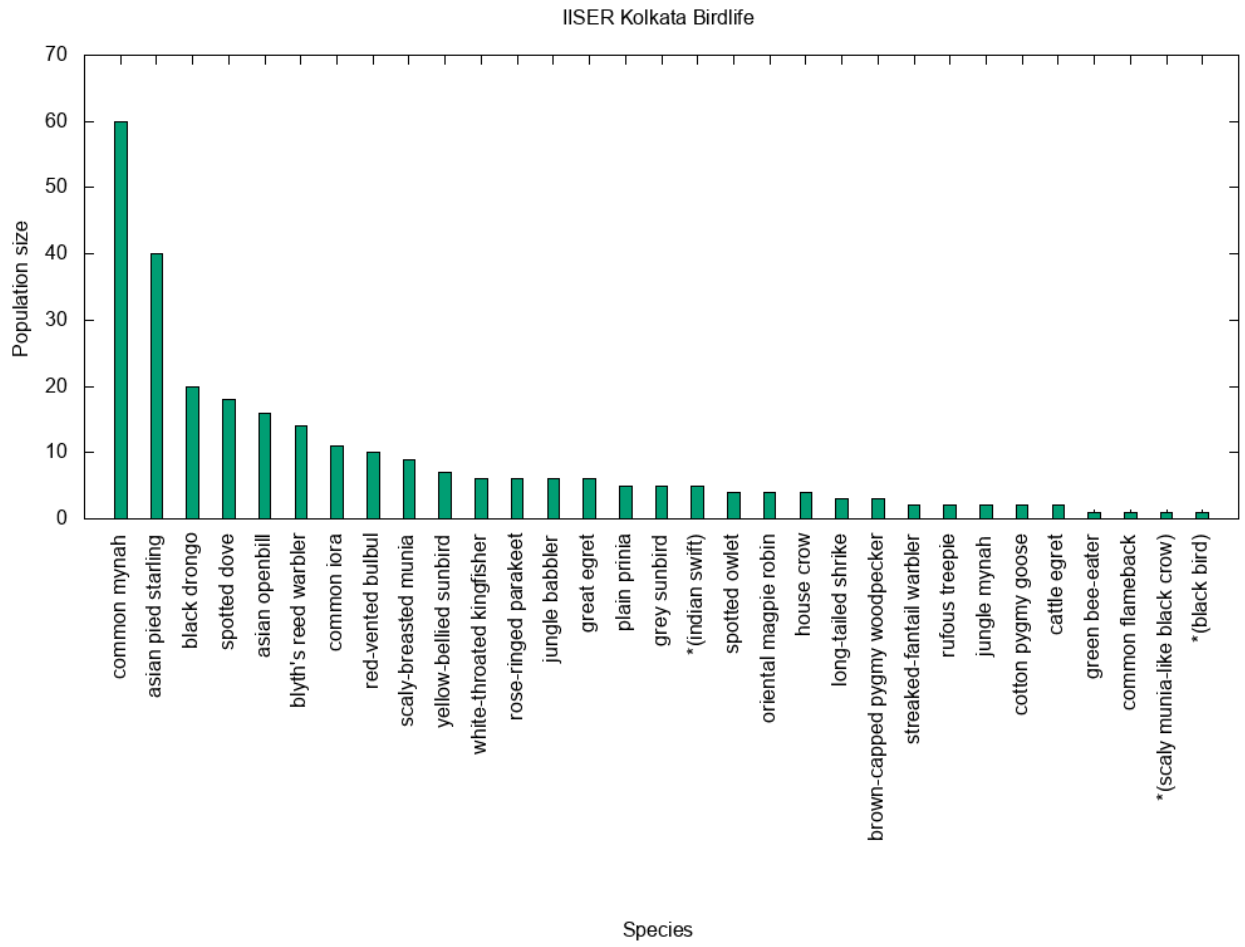
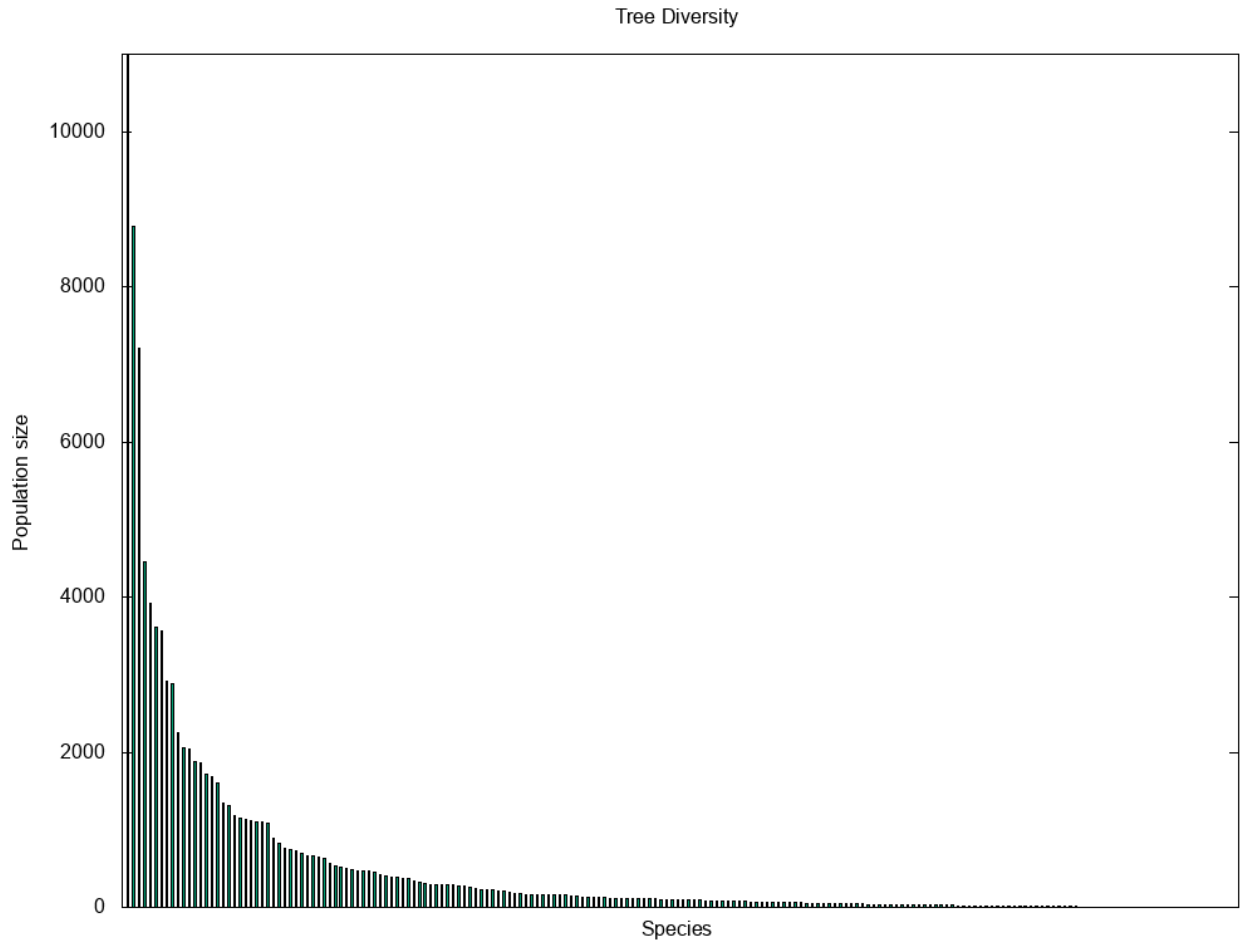
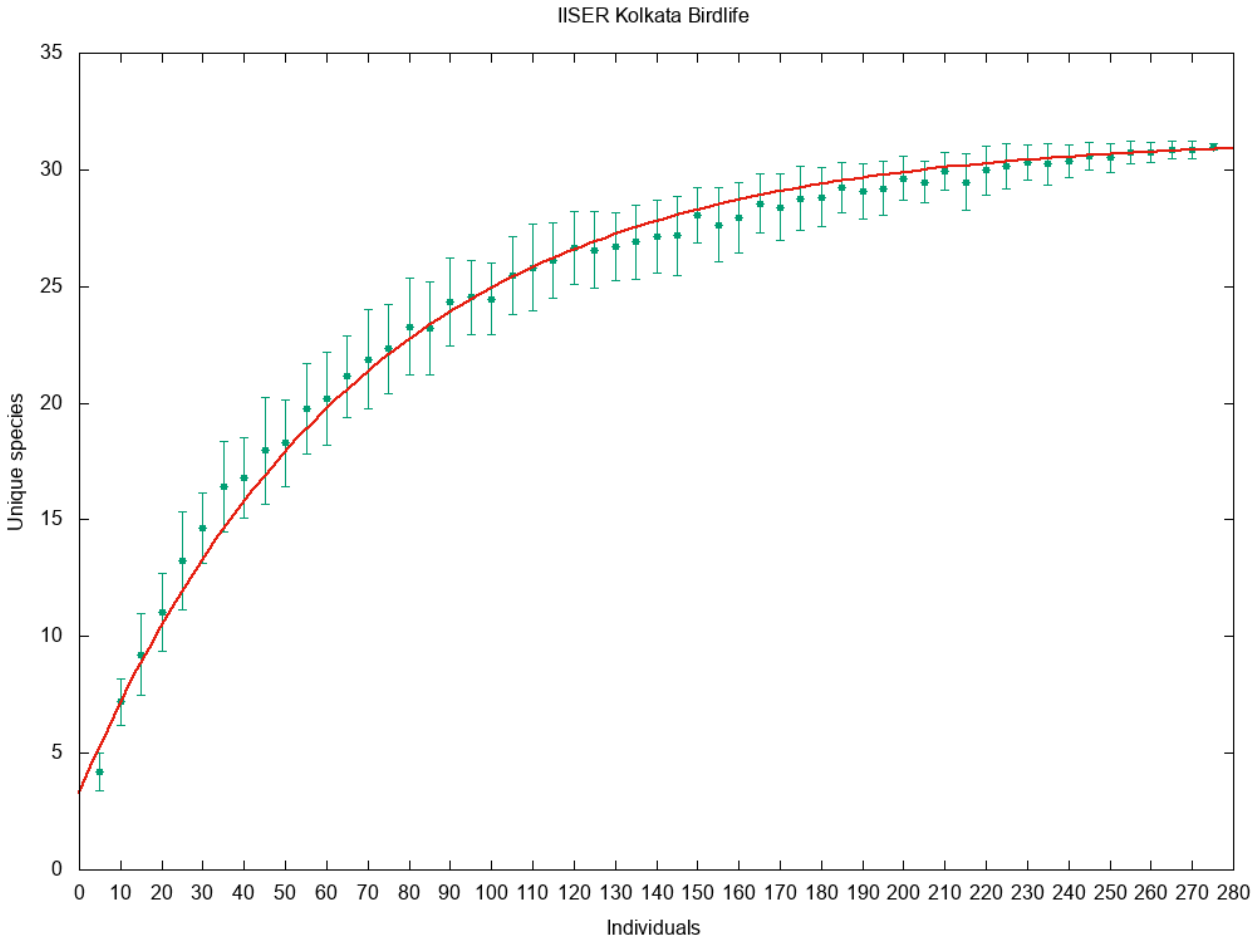
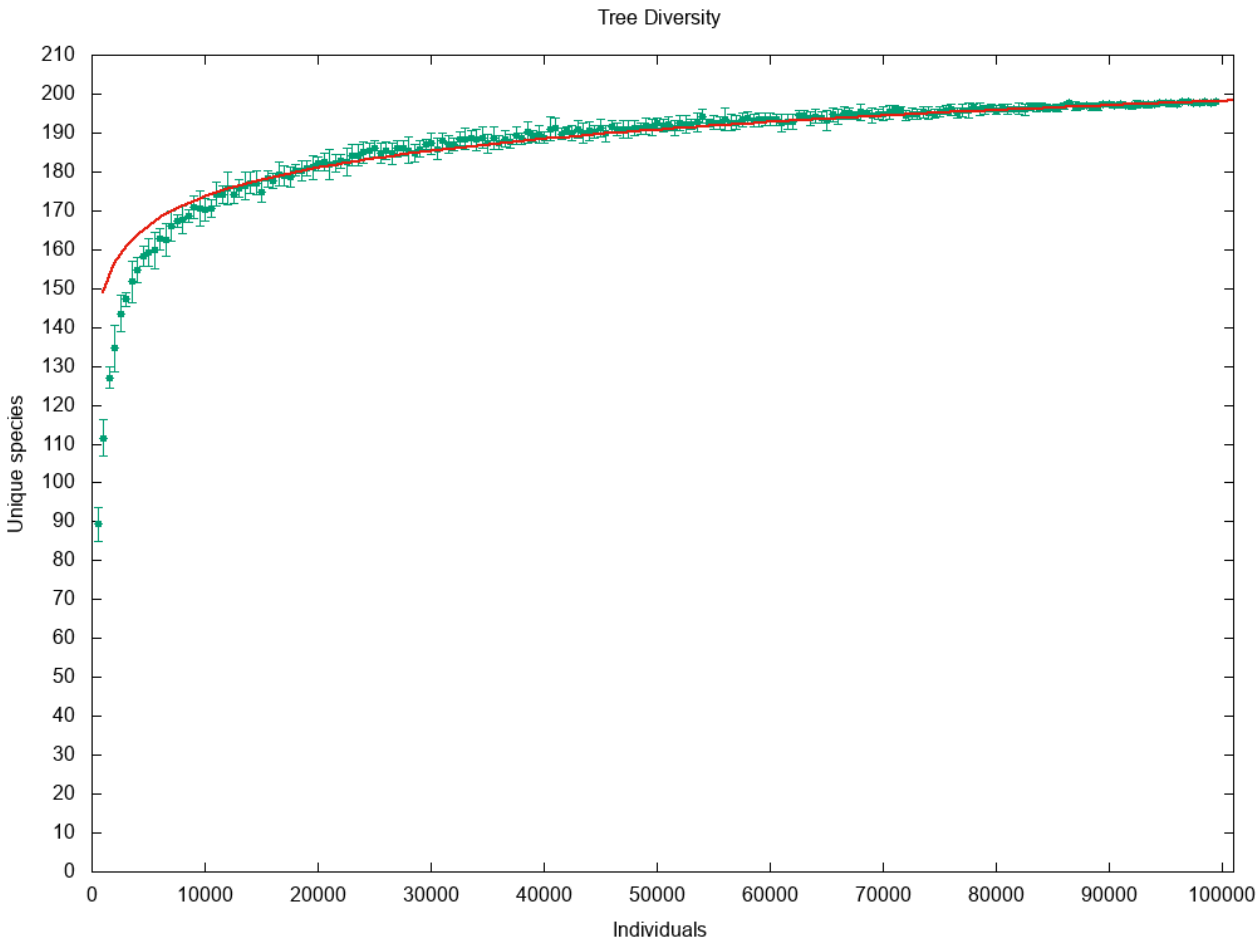





```
60      "common mynah"
40      "asian pied starling"
20      "black drongo"
```


IISER Kolkata Birdlife
Unique species
Individuals
0
5
10
15
20
25
30
35
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280


Tree Diversity
Unique species
Individuals
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
0 10000 20000 30000 40000 50000 60000 70000 80000 90000 100000

```
18      "spotted dove"
16      "asian openbill"
14      "blyth's reed warbler"
11      "common iora"
10      "red-vented bulbul"
9       "scaly-breasted munia"
7       "yellow-bellied sunbird"
6       "white-throated kingfisher"
6       "rose-ringed parakeet"
6       "jungle babbler"
6       "great egret"
5       "plain prinia"
5       "grey sunbird"
5       "*(indian swift)"
4       "spotted owlet"
4       "oriental magpie robin"
4       "house crow"
3       "long-tailed shrike"
3       "brown-capped pygmy woodpecker"
2       "streaked-fantail warbler"
2       "rufous treepie"
2       "jungle mynah"
2       "cotton pygmy goose"
2       "cattle egret"
1       "green bee-eater"
1       "common flameback"
1       "*(scaly munia-like black crow)"
1       "*(black bird)"
```

```
#!/usr/bin/env python

# Calculates the simpson index of diversity for given data.

# Usage:
#   ./simpson.py [frequencies]
#
# frequencies   list (space separated) of frequencies of species

from os import sys
import math

data = map(int, sys.argv[1:])
n = sum(data)
d = 0

for x in data:
    p = x * 1.0 / n
    d += p*p

print d
```

10976	"HUMBLA"	281	"GOMPSE"	60	"WALSPI"	4	"MEMEA_"
8788	"AGROIN"	261	"TRICER"	56	"NOTHFO"	3	"SYMPEL"
7203	"MESUNA"	237	"EUPHLO"	55	"SYZYAM"	3	"CASEZE"
4460	"UNIDEN"	232	"SYMPCO"	53	"EUGERI"	3	"BOMBCE"
3926	"GARCHE"	224	"PODATH"	52	"DYSOBI"	2	"SYZYMI"
3614	"SHORDI"	222	"SEMESU"	51	"SCOLAC"	2	"SYMPCC"
3567	"AGROHO"	216	"DILLRE"	50	"LIJNGA"	2	"PAGIDI"
2912	"PSYCNI"	215	"CALOBR"	49	"CHIOAL"	2	"EUONWA"
2886	"MESUFE"	197	"SYZYMA"	48	"CAMPZE"	2	"CLIDHI"
2249	"SHORWO"	179	"ACTIAL"	45	"MELAMA"	2	"CANTDI"
2062	"SHORAF"	174	"TIMOJA"	41	"PALAHI"	1	"WENDBI"
2037	"UROPEL"	167	"ELAESU"	41	"CALOTR"	1	"STRYMI"
1885	"SHORCR"	165	"GYRIWA"	40	"BYRSEL"	1	"PALAGR"
1859	"CULLCE"	163	"URANAP"	37	"SYZYOP"	1	"MASTNI"
1724	"SCHUCA"	163	"SYMPCU"	37	"DESMZE"	1	"KOKOZE"
1680	"PALACA"	162	"STRONA"	37	"ARTONO"	1	"FRAGZE"
1596	"SHORME"	161	"PUTRRO"	36	"MEMEB_"	1	"CARYUR"
1340	"MYRIDA"	159	"CINNVE"	35	"MEMESY"	1	"BRIDRE"
1320	"SHORTR"	154	"PAVEIN"	35	"MEMED_"		
1190	"GAERVA"	141	"SYZYLI"	33	"PRUNWA"		
1148	"CULLRO"	139	"MALLRH"	33	"PALALA"		
1126	"XYLOCH"	137	"GOMPTE"	30	"CLEIPA"		
1123	"SEMEWA"	132	"SYZYSY"	30	"CINNRI"		
1108	"PSYCDU"	131	"PRISTE"	29	"GARCTE"		
1098	"PALATH"	124	"SEMEAC"	29	"ARDIGA"		
1080	"PALAPE"	123	"MADHFU"	25	"MEMERY"		
896	"GAERRO"	121	"NEOLCA"	25	"MEMEC_"		
834	"ANISCI"	120	"DIOSQU"	25	"ABARBI"		
768	"DIOSAC"	115	"EURYAC"	23	"STEMCA"		
748	"GLOCAC"	113	"DIOSIN"	23	"DIOSRA"		
735	"SYZYNE"	112	"GLOCZE"	19	"OSMEGA"		
703	"MEMEAR"	110	"MEMEPR"	19	"GLOCNE"		
663	"MEMERO"	110	"DYSOPE"	18	"GARCTH"		
659	"CALOTH"	106	"LASIOB"	16	"HORSIR"		
646	"SEMEGA"	106	"ANTIPY"	16	"CLERIN"		
624	"MASTTE"	99	"MALLFU"	15	"MACAIN"		
562	"MANGZE"	97	"SYZYCY"	15	"LASIOL"		
539	"CRYPWI"	97	"MEMEVA"	15	"EUGEIN"		
512	"LITSLO"	97	"AXINZE"	15	"CHAEFE"		
500	"LEEAIN"	95	"SYMPHI"	14	"ADENBI"		
478	"ALLOZE"	94	"ISONLA"	13	"HOMACE"		
472	"SHORST"	91	"PSYCPL"	12	"SYZYCA"		
464	"BHESCE"	90	"GLYCPE"	12	"PERSMA"		
463	"HYDNOC"	88	"POMETO"	12	"CARABR"		
453	"SHORCN"	87	"CARACA"	11	"RANDGA"		
429	"DIOSHI"	86	"VITEAL"	11	"MEMEGR"		
412	"CHAECO"	86	"GONIHO"	11	"CANAZE"		
394	"NARGMA"	80	"SEMENI"	10	"DESMEL"		
392	"HOPEJU"	80	"GARCSP"	9	"MICRWA"		
374	"SYZYWI"	77	"ELAEGL"	9	"FICUHI"		
373	"SYZYSP"	75	"LITSGA"	7	"MACAPE"		
345	"IXORJU"	72	"DIPTHI"	7	"GLOCB_"		
328	"CHAECA"	71	"ERYTOB"	7	"DIOSCH"		
311	"PSEUCH"	70	"SYZYAQ"	6	"ARTOGO"		
297	"APAMSI"	68	"MEMECL"	5	"SWIEMA"		
295	"GARCMO"	68	"AGLAAP"	5	"DIOSSY"		
294	"CINNCA"	67	"CINNDU"	5	"DILLTR"		
287	"NOTHBE"	66	"DIOSAL"	5	"CHRYRO"		
287	"GLENUN"	63	"PSYCGL"	5	"BRIDMO"		
282	"LITSIT"	63	"HOPEDI"	5	"APORCA"		

```
#!/usr/bin/env python

# Calculates species-individual curve data by repeated, random sampling.

# Usage:
#   ./species_individual.py trials step [frequencies]
#
# trials        number of trials for a given sample size
# step          incremenent of sample size
# frequencies   list (space separated) of frequencies of species

from os import sys
from statistics import stdev
import random
import math

trials = int(sys.argv[1])
step = int(sys.argv[2])
data = map(int, sys.argv[3:])
n = sum(data)

individuals = []
for i, frequency in enumerate(data):
    individuals += [i] * frequency

def count_unique(l):
    return len(set(l))

for i in range(step, n, step):
    counts = []
    for j in range(trials):
        counts.append(count_unique(random.sample(individuals, i)))
    s = stdev(counts)
    if s == 0:
        s = 1e-12
    print '{}\t{}\t{}'.format(i, 1.0 * sum(counts) / trials, s)


#!/usr/bin/env python

# Calculates the shannon index of diversity for given data.

# Usage:
#   ./shannon.py [frequencies]
#
# frequencies   list (space separated) of frequencies of species

from os import sys
import math

data = map(int, sys.argv[1:])
n = sum(data)
h = 0

for x in data:
    p = x * 1.0 / n
    h += p * math.log(p)

print -h
```