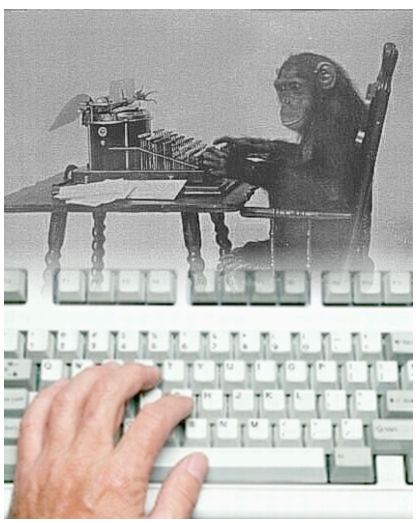
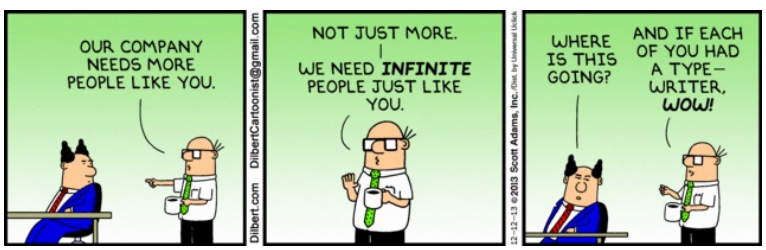
# Day 10

1. Extra Vernam assignment due today Feb 8
   Extra Hill assignment due next week Feb 15
2. Probability paradox
3. Craps bets
4. Model English w/ probability
5. Break Ceasar/Vigenere





Couples in a given country want to have boys so they decide that if they have a boy or if they have three girls in a row then they will stop having children.

B GB GGB GGG

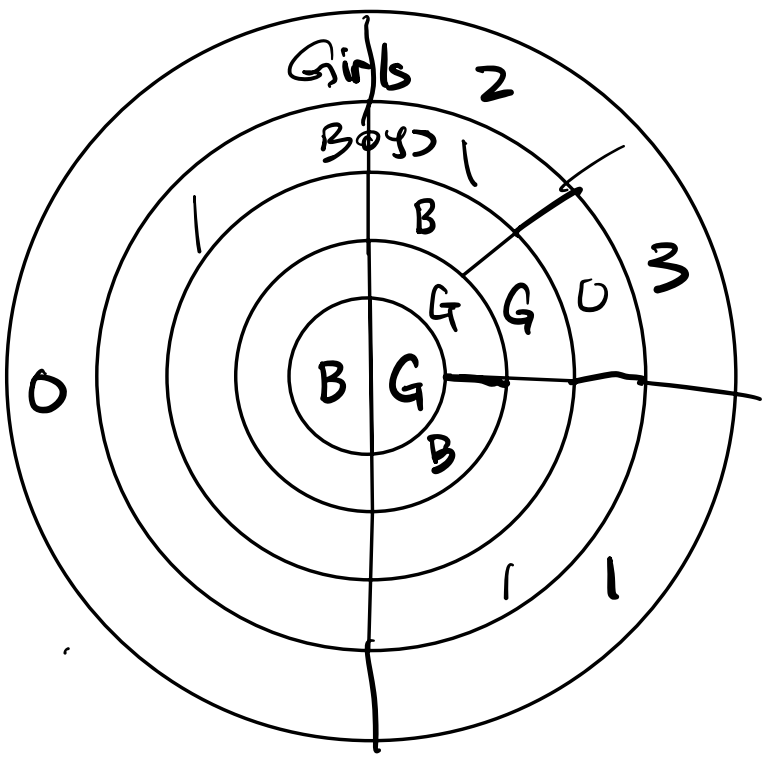
What is the expected number of boys and girls on average for 10,000 couples?:

3 (a) more than half boys

8 (b) more than half girls

0 (c) same number of boys and girls

0 (d) don't know/don't care




Q. What is expected # of Boys?
What is expected # of Girls?

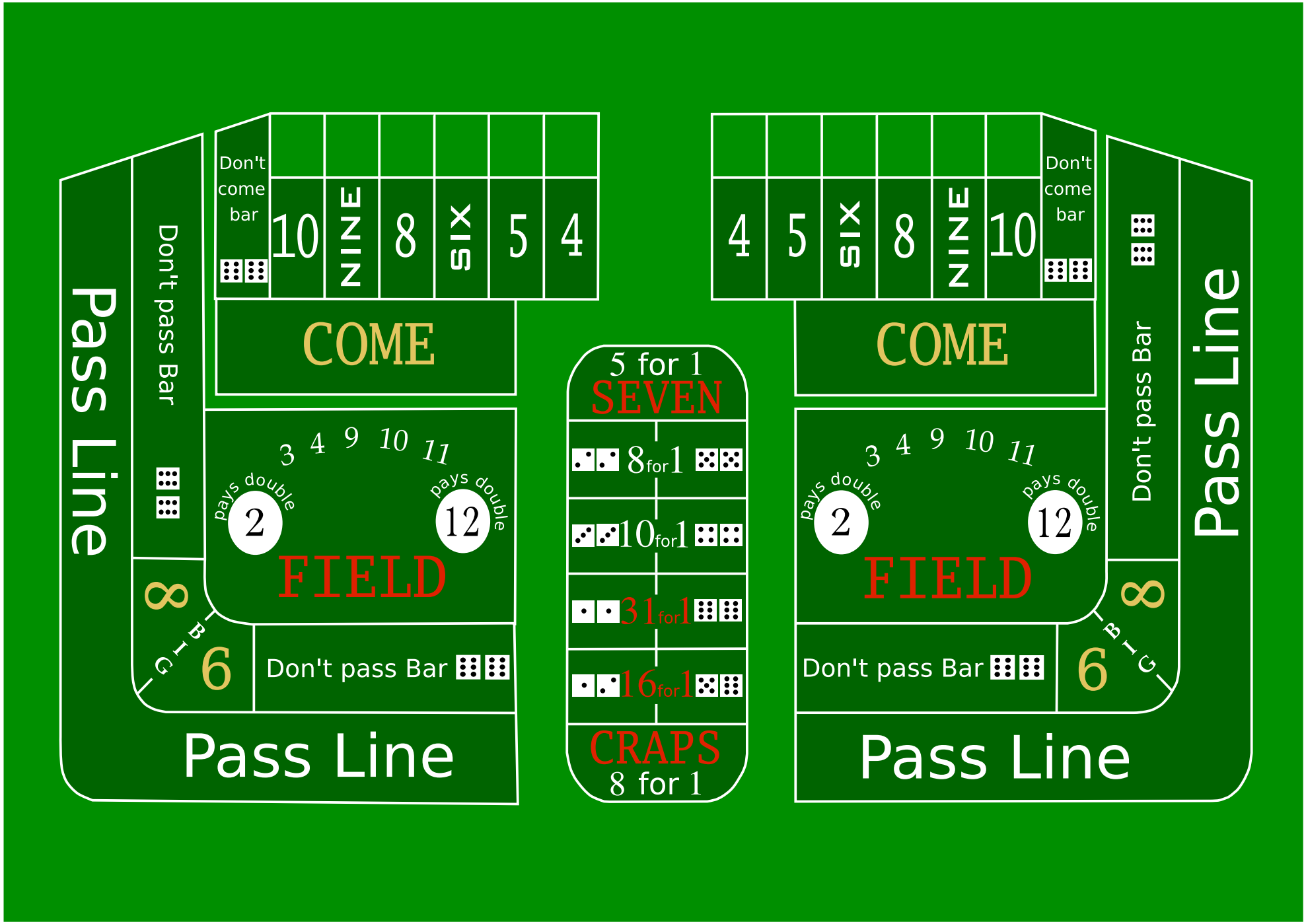
$$E(\text{Boys}) = \frac{7}{8} \cdot 1 + \frac{1}{8} \cdot 0 = 7/8$$

$$E(\text{Girls}) = \frac{1}{2} \cdot 0 + \frac{1}{4} \cdot 1 + \frac{1}{8} \cdot 2 + \frac{1}{8} \cdot 3$$

$$= \frac{2}{8} + \frac{2}{8} + \frac{3}{8} = 7/8$$

$E(X) = 1 \cdot .492\overline{9} - 1 \cdot .50\overline{7}$
$= -.014\ldots$

| Name of Bet | Description | Payoff per $1 | P(Win) | P(Lose) | House Advantange |
|---|---|---|---|---|---|
| Pass Bet | 2,3,12 -lose<br>7,11-win<br>4,5,6,8,9,10- this is the point shooter rolls again until either 7 or the point comes up<br>if point is first then win<br>if 7 is first then lose | $1 | .492929 | .507070 | 1.4% |
| Don't Pass Bet | 2,3- win 12-roll again<br>7,11- lose<br>4,5,6,7,9,10- this is the point shooter rolls again until either 7 or the point comes up<br>if the point is first then lose<br>if 7 is first then win | $1 | .492929 | .507070 | 1.4% |
| Field Bet | The next roll is<br>2,3,4,9,10,11,12-win<br>5, 6, 7, 8-lose | $2 for 2 or 12<br>$1 otherwise | $\frac{2+3+4+3+2+1+1}{36}$ | $\frac{4+5+6+5}{36}$ | $1\cdot(\frac{2}{36}+\frac{2}{36}+\frac{1}{36}+\frac{2}{36}+\frac{2}{36}) +2\cdot\frac{1}{36}+2\cdot\frac{1}{36} -1\cdot(\frac{1}{36}+\frac{2}{36}+\frac{1}{36}+\frac{2}{36}) \approx 5.5\% = -.0\overline{5}$ |
| Any Craps | The next roll is 2, 3, 12-win<br>4, 5, 6, 7, 8, 9, 10, 11- lose | $7 | $\frac{1+2+1}{36} = \frac{1}{9}$ | $\frac{8}{9}$ | $\frac{1}{9}\cdot 7 - \frac{8}{9}\cdot 1 = -\frac{1}{9}$<br>11.1% |
| Any 7 | The next roll is a 7- win<br>2,3,4,5,6,8,9,10,11,12- lose | $4 | $\frac{6}{36}$ | $\frac{5}{6} = \frac{30}{36}$ | $4\cdot\frac{1}{6} - 1\cdot\frac{5}{6} = -\frac{1}{6}$<br>16.6% |
| Big 6 | If a 6 is rolled before a 7-win<br>If a 7 is rolled before a 6-lose | $1 | $\frac{5}{11}$ | $\frac{6}{11}$ | $1\cdot\frac{5}{11} - 1\cdot\frac{6}{11} = -\frac{1}{11}$<br>9.09% |
| Big 8 | If a 8 is rolled before a 7-win<br>If a 7 is rolled before a 8-lose | $1 | $\frac{5}{11}$ | $\frac{6}{11}$ | $1\cdot\frac{5}{11} - 1\cdot\frac{6}{11} = -\frac{1}{11}$<br>9.09% |
| 4 Hardway | If a pair of twos is rolled before a 7 or before a 1 and 3- win otherwise lose | $7 | $\frac{1}{9}$ | $\frac{8}{9}$ | $7\cdot\frac{1}{9} - 1\cdot\frac{8}{9} = -\frac{1}{9}$<br>11.1% |
| 10 Hardway | If a pair of fives is rolled before a 7 or before a 4 and a 6- win otherwise lose | $7 | $\frac{1}{9}$ | $\frac{8}{9}$ | $7\cdot\frac{1}{9} - 1\cdot\frac{8}{9} = -\frac{1}{9}$<br>11.1% |
| 6 Hardway | If a pair of threes is rolled before a 7 or before 2&4 or 1&5-win otherwise lose | $9 | $\frac{1}{11}$ | $\frac{10}{11}$ | $9\cdot\frac{1}{11} - 1\cdot\frac{10}{11} = -\frac{1}{11}$<br>9.09% |
| 8 Hardway | If a pair of fours is rolled before a 7 or before 2&6 or 3&5-win otherwise lose | $9 | $\frac{1}{11}$ | $\frac{10}{11}$ | $9\cdot\frac{1}{11} - 1\cdot\frac{10}{11} = -\frac{1}{11}$<br>9.09% |


Don't come bar
10
NINE
8
SIX
5
4
COME
Pass Line
Don't pass Bar
3 4 9 10 11
pays double
2
12
pays double
FIELD
8
BIG
6
Don't pass Bar
Pass Line
5 for 1
SEVEN
8 for 1
10 for 1
31 for 1
16 for 1
CRAPS
8 for 1
4
5
SIX
8
NINE
10
Don't come bar
COME
Don't pass Bar
Pass Line
3 4 9 10 11
pays double
2
12
pays double
FIELD
8
BIG
6
Don't pass Bar
Pass Line

# Some Monkey Words

The letters of the following words were chosen at random with equal probability.

zotwz kjptg uudrx mtagh gaqvl uhuaf oymcu iljaa jancm bxpbi cvcdo oceza wrgzg
wweuk phqvq rqtwq axqqm yxngh rsxch gsocp sssda jmjhl ykyml kdefv tmafc ncsiu
anunv hcwyy ueikr ifzta abjrq kiaez abjka hufwa fjenl ptpqm exjhx vzmeg uayxu
dkxid agsst gutif qzmyc lvood sobrh tkjoq vkghf rgxad frywd bkwql uvcpk qjdkk
mugak krwcb gpgsf dwsxu vafik sxiev lejjq pznet fjtqc jhnic vojrv ucfib nuzgb
xahvu lvwyq spvtf zdxob aigfa wgjeq wcqoe bbmbm fdrvx znhbo ovxqu lzznh vmdjj
kfkig jnugp xxgnf hhliw oveje mvujj hqucs plcuo aijqt hlgdj pvhhi jwyqo wbhbo
qcwtc ahbyt xbvrc kvcby etllo bgouc lwwer ewzpj yhysb grtba betir hekem mhjwl
zflze jtalc gxvhz rkaxp qastv ibuzn jvqvt vtxgw nvnlj muqwx nddwh gggrk jqgrp
xxahd tbvuw hgjya bnoqg yfwap gohru huluh xmhtu kbbxv toywf imblw shacr taaqv
xyamm ggbcp ykial aipgv osyqq iwwrw ivhpj ybugr rscvx zbdgy ndesm endwt tbgmd
yroti vvqas xbixy qzckh ayzaz bmsns macws skbqb orcva mxaah wdjax rpfwa tgepf
ckjgv msyiv nkemr lksbd fyrtv sgxlb ryqbd zkjed uornf fgcft harsx xonas pttlr
qrraj hwerm oanup pqkww wmtog sjblk hdgac etadi ljlql tfkla bfxug dwfow corfo
qnwjd tnaib sicil bukam jxhjx uyygr yhfxq goxor vgxsb ngnka pojfr mgoni rntkk
yjxua llggz yyuzf bijhf pfctu hnipg oczle glfli lozhs qcvmw ueuyl jnuxp xzpaz
otkyt jtaws ejigu xiqin txded zghgb jtovo oiaqa moiar yklzv kxmpe rtxwz qpvkz
chqxl mixcz kchjw xeljr hryqr kdbyp tirep whomf eoxwh iblae gbary qqhmi wcaam
vkyup zlkjx fwium pwske xfchv xxcap tauyz jqodr lehsc ssvos avjoh pbqif kpuch
bhmvv yojmr dhfvw gwruc xjywu fmlqe joqbi pwhci hcnjq xwktm sslpc ktwwd biwbl
hqtxz yismt tpovm vbdxk nibab ukxqo ahyzk vrwhb fgezq tkves veqlr pjiww dheql
zgyyt gjbjp npobo rcncd pxaqj rzolr ibtfe ddfri ahglo cjfcf kjqrp cacwt aipoe
jcndr nhnhi efugo blkhi ahvjj rxoxq mbcnn wlvqd ryoel oprtj grotg gnien jvruf
atedb piprx bywxl wluwv shxfx xmxxm aodlg mbfxk otpix rcfgo ylffg jyzvx wyvbe
exovx fgrqz umawo uyfua mzruo muols rpfyf fwkto tgdpn erwbi zqsva eyyxf mleas
trwhd nmosb kknqo nfiwm jaxhq woxeq sqipi xemfj cpxcq yhkvb zyelo mnaky rovgt
yzrek grdzk qvkog pgxpx gghhz lclgc osdrd biedw eujdz onvuz dcuoc vothj rtodx
dygqw ezhkf vghih vzyny aswum ulwcd jxsgf aibfp iwmwq qepaw npazz pwbzj aqpqo
jrfys ccegi anrge yrzzw hkwvs csrmo kpcov bvsqk cmhlv kapoo mszzc zzoql vpzxp
wsiyx oiljc joriz nnrfm prifj nnkaa zmdym kahue nicek zlxbo kelin wtvxd hekse

# Some English Monkey Words

A monkey types on a keyboard but this time the frequencies of letters that he types are the same as one would find in average English text.

ccgai teeir euerd ommal iltom eeoys uneep risrf ocoee ifspo maxpu eerci upomr
samiu eeitr eeopo cuoic uelnr eoeew usleo mestr etfok thiee ocart tssss rseaa
anior oisda fteoa doals oiatl uyvre tiiit hifhq loean pvoom nuala appes aicha
capts ttwnh rsios fohln efsmh hnfee wtdwo ptnip toipi eretn jrpsh suodo rtuee
eosrf ueats tsedt aalet tplcf eanin tetdt evaos lefee dffsm eotfu seber keega
ehafe raaes uhtan nnspr dogoh esncn oooed hrrnu umrky hrhbe rttsn daofo otiqi
deepe fnaso atnnr heaes sinfa ogoeh oxint tdehr wsest reknd hcpte iaogg tdfro
ttsiu nrnle jpeof xyatt asdis aopon aoyrh ahsos dytic unswa efdrt eodrd toiro
efeni seief hnvao itieu ffdht pottr exewo darnh teeos yilem taros rclof octns
ltdte liatr altsi eescr tsiru oavre dtiay esait kttha fpdqt iteas ooocf rtmee
rwtez isaru ptask uneea cbsoi sedsr tocre nitda utous ehtia dnifi ratla defls
yiuib aldcn neyed dqsse ogtsi wiexu erpas rsoyr ocpdi oitdu opsju neesh sneea
htnol smrtf ionfd ntcoo himam arhyv olodp eanei roaie clued fecrm haeei opnar
hilau tprrt etaen htnfs naahi tiavf dorat idcmp nlyic eeiir nmgih cuuie sopeo
lifdg rowni lftif eodfe ceese haeii pfnrp yenin aaeoi drnll nawtl anite eoeor
oreel ehtrt wrree ortcd rnnan seiij yeodf qetwl instb ynrcx rdcth ftrne oeath
eospr qclea ntyep emifo raotx eaodx eklai rntpn rcaiw euvao caiio udlvt eghte
swvel ltase axpth ypati hotfn xoevt hotor oomcr yhlof eossc maego sahdt waopo
reeza elrdn itgen sauwu otdpe meeor wtnot dnvtt leuen eeeod tsdml nendf lnhta
chdeo rrnli kmolx nfwul ptste ntdwe ptehn pnosn dnoet hnols adtes asnen heoey
dofsr oyprg foina sosie nceoe suxlp eirpe tarac nyaot oedfa oaivf edgfn orgrt
nmrer noaes xeisi dttex mteiw ptwot afkwi deiee nludn iiinn nitlr tripb elret
eedrl ngsan tacse foudh oinnu xiiep footn rdlep ryvtn nlstn fneit ewemr eryae
pssnu ctmye ncenm aosnm ounnn ouswn tmref nnnol msplt meptc ebyke smeni inecl
edoen rnctr airwn mbere oanty sefcp eekdo steat eahir ootaf tfdel oslor oerop
enmst nssda gesrf nmtie staem uhfil erpun retel pdoea evwmr dnuvi aetme fwdeo
avlag syera nsnth eidns mitcc refst tfede lpsrw nswtn snere iloaa ioesy isprr
yuacm eoene rdrum rrtmy ubmol taemr ansst xeccs rrltn osnne nnern onsir mnite
stwss utrst iudeo dnnau tyllt etnoo ereho nslyl elpee sryen yctsm camee uheuw

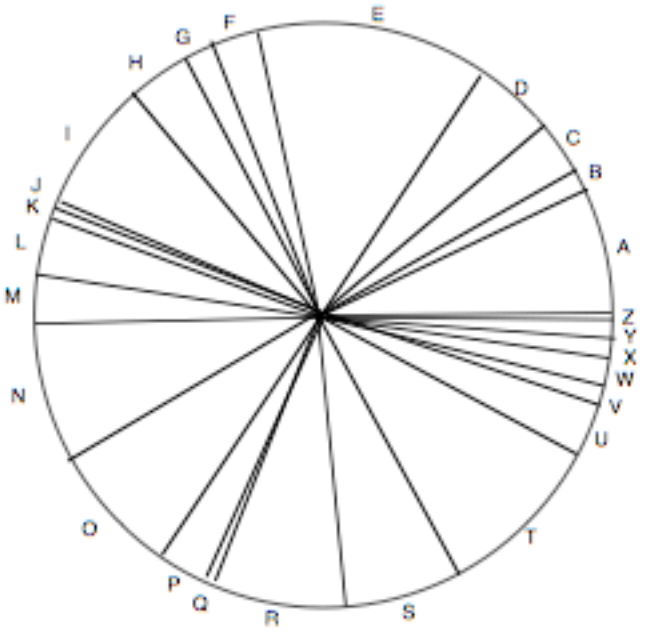
# Some Bi-letter English Monkey Words

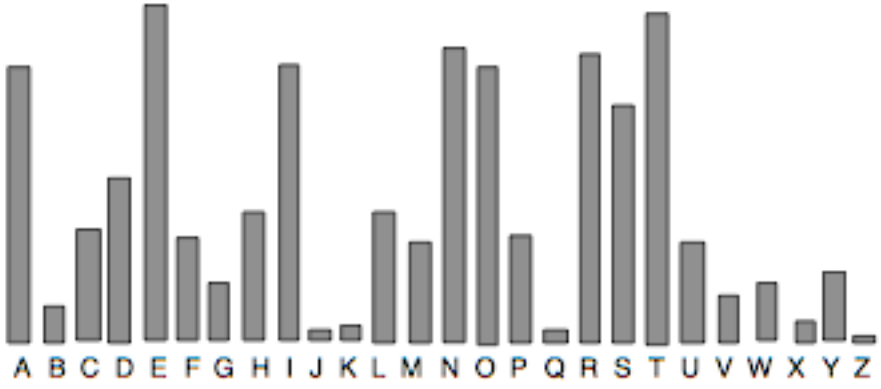
A monkey types on a keyboard, the first letter appears with frequency in an English word, the second through fourth letters are chosen with a probability using a biletter frequency table given that the previous letter has been chosen.

thint oucon dingi these ryere veega manen elers dengi hedda hesnc rmiss isonk
ticic utasu thede thore ighab benan dilet sinya nthea rived there xched tenor
omobo diome emeth esast nyazz nscec rikir asthe everr blari disul hengi rinea
denth dmewo lralt rapol ldbre dites menti hesce osece oriom thear lloas ponoo
thesi ntiai beare veaki seere awhes suert theco ldent lenda sizal ingai irove
searm ereye atere antrn sunga endea plthe overu amese cyebl nynds hsere rtopl
pathe oares rstht stsut fennt enthe vangh ounen asile ninti xpess thegh speni
cigio tsore rendd halla erise siath erere sstra stsou theta ffant ingam onsty
reria costi denoa ezogr eewar gicau indma erofe tosth hetye teror uleem nicad
checo presa ilila derer fontr lasst ibuta atsth lirru maled doror expus grahe
nlsew rlune unche tourk shedr idens istis cenge sofic ruthe errgh rerga nftst
odata taler anthe renim lymer eulld cende ngsta piopo ctour sholl ndowa sengs
didos ndyin nthed toffi segha aveal hesee engom nenhi lesiv rksti susel wante
ofrra enero edemi mpast armop herel evede theys theco epotr lempi nsted rsper
omema ngeat satin pulli orunt erang peese ntiso istit ended resed rteem lldas
cathe evest nssll raicu entth errys ceeca theny tiong hecle seske inogh tlufo
pstav itofo giems feden eeaya erous cousc ikeng sulde scers derth renio penth
stuan shend calic whiso ndics eroro mprer spapo erint tluge tithe narda orkre
ecrad eromi ordst erofi iomim atofe trmin whall famer xcost stale sldev edowa
ourio dedut enerm narot nvily ndeys ndise sanmm egati ychis thamb dansh lomem
rmoni praut sesiv oumut erthe ethod enepa erkan poida lentl rorch fresi thess
inthe ctans ppomi halye owero sitye oneth oryei oulor whali deist eathe inicy
esfon gesti rleme ndesw wheit olalo eedit titha tanat isona haned ngrer tonmo
tryst ulyor tewed conce herrd lexar isoma savio dyent ainow senor cirsc utest
finin acewe weryo redee sofor nstta sousi kstco emese delin hedle demev ppain
nyesh sithe eatea witue ededi eathe wicel nther kesin latex foken ecoup londi
thofo esive arkeg ngrer deply anthe sermo peour rontl ayerc redul ncoti ullor
overt ttror tipom abyri aslld orent eyoch mersa heaye ameat ronef sedei utidc
usper rares issth ysand amast nicec ereth ithan stson aysoi damia nsais shani
dsoth trket sstrb rolly onthe retec egron stomy thena ooiti rvesi esagh putro

| | | |
|---|---|---|
| A | -> | 73 |
| B | -> | 9 |
| C | -> | 30 |
| D | -> | 44 |
| E | -> | 130 |
| F | -> | 28 |
| G | -> | 16 |
| H | -> | 35 |
| I | -> | 74 |
| J | -> | 2 |
| K | -> | 3 |
| L | -> | 35 |
| M | -> | 25 |
| N | -> | 78 |
| O | -> | 74 |
| P | -> | 27 |
| Q | -> | 3 |
| R | -> | 77 |
| S | -> | 63 |
| T | -> | 93 |
| U | -> | 27 |
| V | -> | 13 |
| W | -> | 16 |
| X | -> | 5 |
| Y | -> | 19 |
| Z | -> | 1 |

| | | |
|---|---|---|
| E | -> | 130 |
| T | -> | 93 |
| N | -> | 78 |
| R | -> | 77 |
| I | -> | 74 |
| O | -> | 74 |
| A | -> | 73 |
| S | -> | 63 |
| D | -> | 44 |
| H | -> | 35 |
| L | -> | 35 |
| C | -> | 30 |
| F | -> | 28 |
| P | -> | 27 |
| U | -> | 27 |
| M | -> | 25 |
| Y | -> | 19 |
| G | -> | 16 |
| W | -> | 16 |
| V | -> | 13 |
| B | -> | 9 |
| X | -> | 5 |
| K | -> | 3 |
| Q | -> | 3 |
| J | -> | 2 |
| Z | -> | 1 |



# TABLE OF ENGLISH BILETTER CONDITIONAL PROBABILITIES

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | 11 | 193 | 388 | 469 | 20 | 100 | 233 | 20 | 480 | 20 | 103 | 1052 | 281 | 1878 | 8 | 222 | 0 | 1180 | 1001 | 1574 | 137 | 212 | 57 | 26 | 312 | 23 |
| B | 932 | 57 | 16 | 8 | 3220 | 0 | 0 | 0 | 605 | 57 | 0 | 1243 | 49 | 0 | 965 | 0 | 0 | 662 | 229 | 49 | 727 | 16 | 0 | 0 | 1165 | 0 |
| C | 1202 | 0 | 196 | 4 | 1707 | 0 | 0 | 1277 | 761 | 0 | 324 | 369 | 15 | 11 | 2283 | 0 | 4 | 426 | 87 | 893 | 347 | 0 | 0 | 0 | 94 | 0 |
| D | 1044 | 20 | 26 | 218 | 3778 | 7 | 132 | 7 | 1803 | 33 | 0 | 125 | 178 | 53 | 733 | 0 | 7 | 324 | 495 | 13 | 601 | 99 | 40 | 0 | 264 | 0 |
| E | 660 | 36 | 433 | 1195 | 438 | 142 | 125 | 21 | 158 | 5 | 36 | 456 | 340 | 1382 | 40 | 192 | 34 | 1927 | 1231 | 404 | 48 | 215 | 205 | 152 | 121 | 4 |
| F | 838 | 0 | 0 | 0 | 1283 | 924 | 0 | 0 | 1608 | 0 | 0 | 299 | 9 | 9 | 2788 | 0 | 0 | 1215 | 26 | 496 | 462 | 0 | 0 | 0 | 43 | 0 |
| G | 1078 | 0 | 0 | 18 | 2393 | 0 | 177 | 1281 | 839 | 0 | 0 | 203 | 27 | 451 | 1140 | 0 | 0 | 1325 | 256 | 247 | 512 | 0 | 0 | 0 | 53 | 0 |
| H | 1770 | 5 | 14 | 8 | 5624 | 0 | 0 | 5 | 1168 | 0 | 0 | 16 | 16 | 38 | 786 | 0 | 0 | 153 | 27 | 233 | 85 | 0 | 11 | 0 | 41 | 0 |
| I | 380 | 82 | 767 | 459 | 437 | 129 | 280 | 2 | 16 | 0 | 50 | 567 | 297 | 2497 | 893 | 100 | 8 | 342 | 1194 | 1135 | 11 | 250 | 0 | 23 | 2 | 79 |
| J | 1259 | 0 | 0 | 0 | 1818 | 0 | 0 | 0 | 350 | 0 | 0 | 0 | 0 | 0 | 3147 | 0 | 0 | 70 | 0 | 0 | 3356 | 0 | 0 | 0 | 0 | 0 |
| K | 395 | 28 | 0 | 28 | 5283 | 28 | 0 | 198 | 1582 | 0 | 113 | 198 | 28 | 565 | 198 | 0 | 0 | 85 | 1102 | 28 | 28 | 0 | 0 | 0 | 113 | 0 |
| L | 1342 | 19 | 22 | 736 | 1918 | 105 | 108 | 0 | 1521 | 0 | 79 | 1413 | 82 | 4 | 778 | 41 | 0 | 34 | 389 | 254 | 269 | 56 | 11 | 0 | 819 | 0 |
| M | 1823 | 337 | 26 | 0 | 2976 | 10 | 0 | 0 | 1345 | 0 | 0 | 10 | 654 | 42 | 1246 | 722 | 0 | 26 | 244 | 5 | 337 | 5 | 0 | 0 | 192 | 0 |
| N | 550 | 4 | 621 | 1681 | 1212 | 102 | 1391 | 13 | 665 | 9 | 66 | 73 | 104 | 194 | 528 | 4 | 7 | 11 | 751 | 1641 | 124 | 68 | 18 | 2 | 157 | 4 |
| O | 85 | 101 | 162 | 231 | 37 | 1299 | 82 | 25 | 92 | 14 | 78 | 416 | 706 | 2191 | 222 | 292 | 0 | 1531 | 357 | 396 | 947 | 334 | 345 | 12 | 41 | 4 |
| P | 1358 | 0 | 6 | 0 | 1747 | 0 | 0 | 237 | 423 | 0 | 0 | 812 | 73 | 6 | 1511 | 581 | 0 | 2305 | 180 | 287 | 457 | 0 | 0 | 0 | 17 | 0 |
| Q | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10000 | 0 | 0 | 0 | 0 | 0 |
| R | 1026 | 33 | 172 | 282 | 2795 | 31 | 175 | 17 | 1181 | 0 | 205 | 164 | 303 | 325 | 1114 | 55 | 0 | 212 | 655 | 596 | 192 | 142 | 17 | 2 | 306 | 0 |
| S | 604 | 12 | 284 | 27 | 1795 | 24 | 0 | 561 | 1177 | 0 | 91 | 145 | 112 | 21 | 706 | 386 | 9 | 27 | 836 | 2484 | 579 | 0 | 39 | 0 | 81 | 0 |
| T | 619 | 3 | 36 | 2 | 1417 | 7 | 2 | 3511 | 1406 | 0 | 0 | 101 | 44 | 15 | 1228 | 3 | 0 | 479 | 418 | 213 | 195 | 5 | 88 | 0 | 203 | 5 |
| U | 344 | 415 | 491 | 243 | 434 | 52 | 382 | 10 | 258 | 0 | 14 | 1097 | 329 | 1518 | 19 | 386 | 0 | 1460 | 1221 | 1255 | 29 | 14 | 0 | 10 | 14 | 5 |
| V | 749 | 0 | 0 | 23 | 6013 | 0 | 0 | 0 | 2568 | 0 | 0 | 0 | 12 | 0 | 530 | 0 | 0 | 0 | 23 | 0 | 12 | 12 | 0 | 0 | 58 | 0 |
| W | 2290 | 8 | 0 | 32 | 1942 | 0 | 0 | 1422 | 2104 | 0 | 0 | 41 | 0 | 357 | 1292 | 0 | 0 | 106 | 366 | 16 | 0 | 0 | 0 | 0 | 24 | 0 |
| X | 672 | 0 | 1119 | 0 | 1269 | 0 | 0 | 75 | 1119 | 0 | 0 | 0 | 75 | 0 | 75 | 3507 | 0 | 0 | 0 | 1716 | 0 | 0 | 0 | 373 | 0 | 0 |
| Y | 586 | 34 | 103 | 69 | 2898 | 0 | 0 | 0 | 691 | 0 | 34 | 172 | 379 | 172 | 2208 | 310 | 0 | 310 | 1518 | 172 | 138 | 0 | 103 | 0 | 69 | 34 |
| Z | 2278 | 0 | 0 | 0 | 4557 | 0 | 0 | 0 | 2152 | 0 | 0 | 127 | 0 | 0 | 506 | 0 | 0 | 0 | 0 | 0 | 127 | 0 | 0 | 0 | 0 | 253 |

To compute this table a typical example of english text was chosen. Then the first row of the table was obtained by recording, for each of 10.000 occurrences of the letter A, the letter that immediately followed it. Thus the entry 469 in the column indexed by D means that in this sample of 10.000 occurrences of the letter A the letter D was observed to immediately follow A exatly 469 times. The same procedure was repeated for each of the letters of the alphabet. We see that in 10.000 occcurrences of Q, the letter U followed it all 10.000 times (not surprising!).
To get the conditional probability P[next lett=Y I prec lett = X] you simply look at the entry in row X and column Y and divide by 10.000.
Thus

P[next letter=E I preceeding letter = R] = 2795/10.000= .27