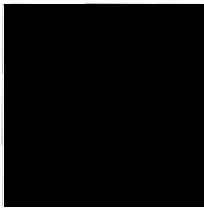Brian
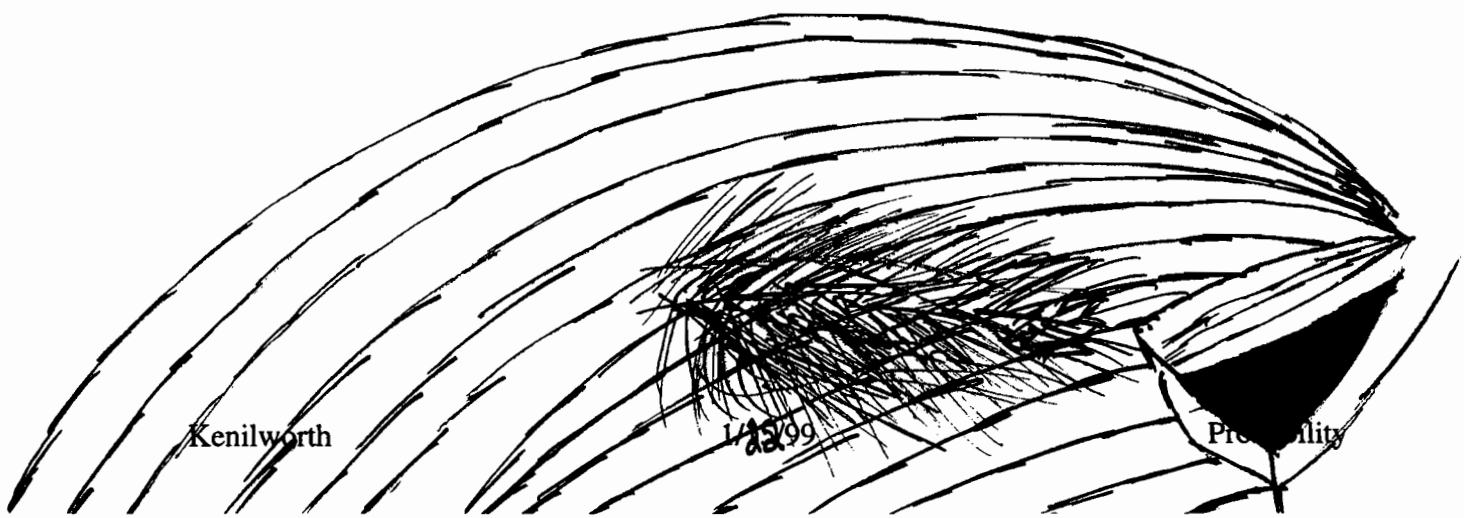
World Series Problem 1

In a "world series" two teams play each other in at least four and at most 7 games. The first team to win four games is the winner of the "world series". Assuming that both teams are equally matched,

What is the probability that a "world series" will be won:

(a) In 4 games ?

(b) In 5 games ?

(c) In 6 games ?

In 7 games ?

Kenilworth 1/12/99 Probability

AAAA   4 games

$P(4 \text{ games}) = 1/16$

Briap

AAAA		-AAABBA	BBBAAB
BBBB		-AABABA	BBABAB
AAABA		-ABAABA	BABBAB
AABAA		-BAAABA	ABBBAB
ABAAA		-AABBAA	BBAADB
BAAAA		-ABABAA	BABABB
BBBAB		-BAABAA	ABBABB
BBABB		-ABBAAA	BAABBB
BABBB		-BABAAA	ABABBB
ABBBB		AABB BB	BBAAAA

-AAABBA	BBBAAAB
-AABABBA	BCABAAB
-ABAABBA	BABBAAB
-BAAABBA	ABBBAAB
-AABBABA	BBAABAB
-ABABABA	BABABAB
-BAABABA	ABBABAB
-ABBAABA	BAABBAB
-BABAABA	ABABBAB
-AABBBAA	BBAAABB
-ABABBAA	BABAABB
-BAABBAA	ABBAABB
-ABBABAA	BAABABB
-BABABAA	ABABABB
-ABBBAAA	BAAABBB
-BABBAAA	ABAABBB

-BBBAAAA	AAABBBB
~~BBABAAA~~	~~AABABBB~~
-BBABAAA	AABABBB
-BBAABAA	AABBABB
-BBAAABA	AABBBAB

World Series Problem 1

Ankur [blacked out]

In a "world series" two teams play each other in at least four and at most 7 games. The first team to win four games is the winner of the "world series". Assuming that both teams are equally matched,

What is the probability that a "world series" will be won:

(a) In 4 games ? $2/16$ • $2/16$

(b) In 5 games ? $8/32$ $4/16$ $4/16$

(c) In 6 games ? $20/64$ $5/16$: $5/16$

(d) In 7 games ? $40/128$ $5/16$

---

4 games
AAAA

1×2

5 games
AAABA
AABAA
ABAAA
BAAAA

4×2

6 games
-AAABBA
-AABBAA
-ABBAAA
BBAAAA
-BAAABA
-BAABAA
-BABAAA
-ABABAA
-ABAABA
-AABABA

10×2

7 games
-AAABBBA
-AABBBAA
-ABBBAAA
-BBBAAAA
-BBAAABA
-BBAABAA
-BBABAAA
-ABBAABA
-ABBABAA
-ABBABAA
-AABBABA
-AABBAAA   -ABABBAA
-BABBAAA   -BAABBAA
-AABABBA
-ABAABBA
-BAAABBA
-BABABAA
-BABAABA
-BABBABA
-ABABABA
-BAABABA

20×2

A or B   B
—————   — — — — —
20×2   2 2 1 1

$\frac{-}{2}$ $\frac{-}{2}$ $\frac{-}{2}$ $\frac{-}{2}$ $\frac{-}{2}$

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$\frac{2}{16}$ (a) In 4 games ?

$\frac{4}{16}$ (b) In 5 games ?

$\frac{5}{16}$ (c) In 6 games ?

$\frac{5}{16}$ (d) In 7 games ?

A A A A
B B B B $\frac{1}{16}$

$\frac{4}{8} \cdot \frac{8}{32}$

$\frac{30}{64}$ $\frac{10}{32}$

$\overline{128}$ $\frac{10}{32}$

$\frac{1}{16}$ $\frac{4}{16}$ 2^7

$4 \ 8 \ 16 \ 32 \ 64 \boxed{128}$
$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

$\frac{10}{32}$

$1 \ 2 \ 2 \ 2$

5

$- \ - \ - \ -$
$1 \ 2 \ 2 \ 2$

$A+B \quad A+B \quad A+B$

$\frac{61}{A \ B}$ $\frac{62}{A \ B}$

A B B B B
B A · · ·
B B A · ·
B B B A ·
A B B B
B B B B

$\overline{2 \cdot 2 \cdot 2 \cdot 2}$ $\frac{2}{32}$ $\frac{7}{32}$ $\frac{10}{32}$

2^n $4 \ 8 \cdot 32 \cdot 40$

$\frac{2}{16}$

$\frac{40}{32}$ $\frac{80}{128}$ $\frac{40}{64}$ $\frac{20}{32}$

128

128
$- 2$
$- 8 \ 16$
$- 20 \ 40$
$\overline{106}$
100
9

$\frac{128}{2}$
$\frac{58}{70}$

2 ~~BB~~ GB GG

B G

1/7

1/3

$\frac{1}{2 \cdot 10^{-1}}$

3   ~~BBB~~ (GGG)

BGG   GBB

GGB   BBG

GBG   BGB

MA

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$\frac{1}{16}$

$\frac{14}{16} < \frac{2}{1}$

$\frac{1}{16}$

$\frac{1}{8}$

$\frac{1}{16}$

AAABA
AABAA
ABAAA

$\frac{64 \times 2}{128}$

127

$\frac{65}{2\sqrt{126}}$

64 32 16 8 4 2 1
0

$\frac{y}{k}$ $\frac{1}{k}$ $\frac{1}{k}$ $\frac{1}{k}$

65

W

L

L L W L L
$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$

1 2 3 4 5
$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{2}$ $\frac{1}{1}$

$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$

Kenilworth

1/22/99
1/15/99

Probability

Mike A.

```
              6
   32   16    8    4    2    1
    1    2    3    4    5    6
    ─    ─    ─    ─    ─    ─
    1    1    1·   0    0    1
    1    1    0·   1    0    1
    1    1    0·   0    1    1
    1    0    1·   1    0    1
    1    0    1·   0    1    1
    1    0    0    1    1    1
    0    1    1    1    0    1
    0    1    0    1    1    1
    0    1    1    0    1    1

    0    0·   1    1    1    1
   ─────────────────────────
    0 ·
```

```
   31
 ·162

   31
   -8
  ────
   23
```

```
   31
  - 1
  ────
   30
```

```
        1
       2·31
      13·3·①
      14·6·④1
    1 5 10 ⑩5 1
   1 6 15 ⑳15 8 1
     1  1  2  3  4  5  6
```

```
        1
      15
       6
      ──
      21
      2²

     ·44

      15
       7
      ──
      2²
```

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$\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{16}$

AABBBAA
ABABBAA
BAABBAA
ABBBAAA
BABBAAA
BBBAAAA
BABABAA
BABABABA
ABBABAA
ABBAABA
BBABAAA
BBBAAAA
BBAABAA
BBAAABA

AAABBBA
AABABBA
ABAABBA
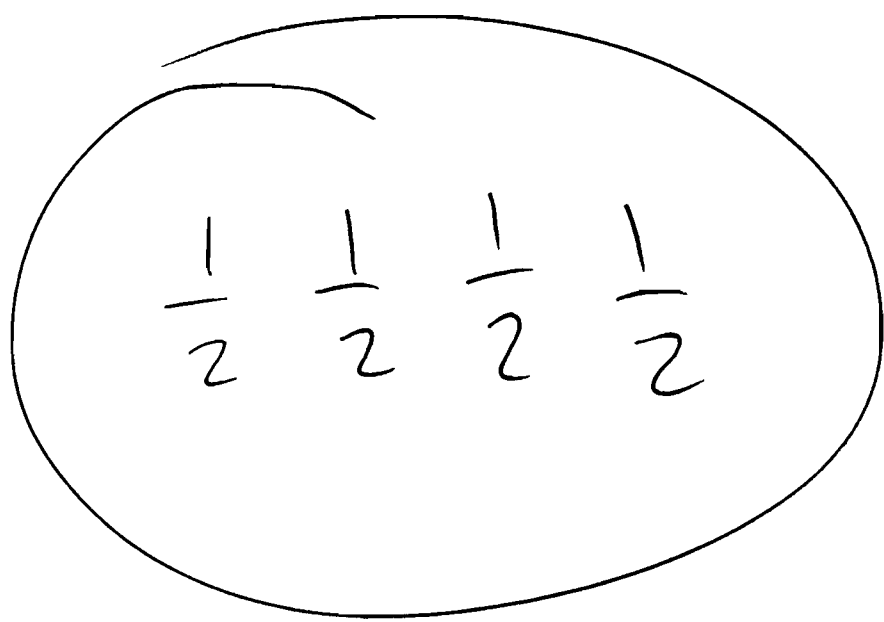BAAABBA
AABBABA
ABABABA
BAABABA
AABBBAA
ABABBAA
BAABBAA
ABBBAAA
BABBAAA
BBBAAAA

$$\frac{1}{2} \quad \frac{1}{2} \quad \frac{1}{2} \quad \frac{1}{2}$$

$$\frac{1}{2^{10} - 1}$$

$$\frac{1}{2^n - 1}$$

BB	BG
GB	GG

BGB   BGG   G

B   B   B

G

G

G

Ronnie