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[illegible]

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0.1 卦象与二进制

- 卦象 由 8 个爻组成，每个爻可以是 阴爻 (broken line) 或 阳爻 (solid line)。1 个爻 / 二进制位 2 个爻 / 3 个爻 /
- 卦象 可以用 Python 列表 [阴, 阴, 阴] 表示 0 个爻 2 个爻
- 卦象 可以用 3 个二进制位表示 LSB, Bit 0 阴 Bit 1 阴 MSB (Bit 2) 阴  
$$\text{Value} = \text{bit}_1 \times 1 + \text{bit}_2 \times 2 + \text{bit}_3 \times 4$$

| 卦序 | 卦名       | 卦象 | 爻象 (从下往上) | 二进制 (Bit 0~2) | 十进制      | 方位 | 卦象 (从下往上)     |
|----|----------|----|-----------|---------------|----------|----|---------------|
| 1  | 乾 (Qian) | ☰  | 阳, 阳, 阳   | [1, 1, 1]     | 7 (111b) | 西北 | 乾 (Northwest) |
| 2  | 兑 (Dui)  | ☱  | 阳, 阴, 阴   | [1, 1, 0]     | 3 (011b) | 西  | 兑 (West)      |
| 3  | 离 (Li)   | ☲  | 阴, 阳, 阴   | [1, 0, 1]     | 5 (101b) | 南  | 离 (South)     |
| 4  | 震 (Zhen) | ☳  | 阴, 阴, 阳   | [1, 0, 0]     | 1 (001b) | 东  | 震 (East)      |
| 5  | 巽 (Xun)  | ☴  | 阴, 阳, 阳   | [0, 1, 1]     | 6 (110b) | 东南 | 巽 (Southeast) |
| 6  | 坎 (Kan)  | ☵  | 阴, 阴, 阳   | [0, 1, 0]     | 2 (010b) | 北  | 坎 (North)     |
| 7  | 艮 (Gen)  | ☶  | 阴, 阳, 阳   | [0, 0, 1]     | 4 (100b) | 东北 | 艮 (Northeast) |
| 8  | 坤 (Kun)  | ☷  | 阴, 阴, 阴   | [0, 0, 0]     | 0 (000b) | 西南 | 坤 (Southwest) |

0.2 卦象与时间

| 卦序 | 卦名 | 时间            | 卦象 | 卦象 |
|----|----|---------------|----|----|
| 1  | 乾  | 23:00 — 01:00 | ☰  | ☰  |
| 2  | 兑  | 01:00 — 03:00 | ☱  | ☱  |
| 3  | 离  | 03:00 — 05:00 | ☲  | ☲  |
| 4  | 震  | 05:00 — 07:00 | ☳  | ☳  |
| 5  | 巽  | 07:00 — 09:00 | ☴  | ☴  |
| 6  | 坎  | 09:00 — 11:00 | ☵  | ☵  |
| 7  | 艮  | 11:00 — 13:00 | ☶  | ☶  |
| 8  | 坤  | 13:00 — 15:00 | ☷  | ☷  |
| 9  | 乾  | 15:00 — 17:00 | ☰  | ☰  |

| 日期 | 星期 | 时间段           | 地点 | 备注 |
|----|----|---------------|----|----|
| 10 | 10 | 17:00 — 19:00 | 10 | 10 |
| 11 | 11 | 19:00 — 21:00 | 11 | 11 |
| 12 | 12 | 21:00 — 23:00 | 12 | 12 |

## 0.3 日期时间戳

日期时间戳的表示方法如下：

- 日期时间戳的表示方法如下：
- 日期时间戳的表示方法如下：

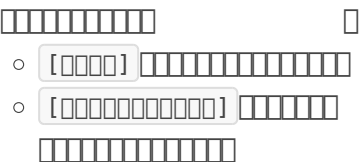
日期时间戳的表示方法如下：

日期时间戳的表示方法如下：

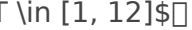
日期时间戳的表示方法如下：

## 日期时间戳 1.1 日期时间戳

- 日期时间戳的表示方法如下：
- 日期时间戳的表示方法如下：

- 
  - 
  -  “ 4 “ ”  
 “ ”

## 1.2

-  F1  F2 
-   $\text{Count}$    $T \in [1, 12]$  
- 
- 
  1.   $\text{Num}_{\text{upper}} = \text{Count}$    $= \text{mod8\_gua}(\text{Count})$  
  2.   $\text{Num}_{\text{lower}} = T$    $= \text{mod8\_gua}(T)$  
  3.   $\text{Dong} = \text{mod6\_yao}(\text{Count} + T)$  
-  F1  F2 

## 1.3

-  F1  F2 
-   $\text{SoundCount}$    $T \in [1, 12]$  
- 
  1.   $\text{Num}_{\text{upper}} = \text{SoundCount}$    $= \text{mod8\_gua}(\text{SoundCount})$  
  2.   $\text{Num}_{\text{lower}} = T$    $= \text{mod8\_gua}(T)$  
  3.   $\text{Dong} = \text{mod6\_yao}(\text{SoundCount} + T)$  
- 

## 1.4

-  F1  F2 

### 1.4.1

- 
- 
  -  /  /  / 
  -   $P_{\text{left}}$    $P_{\text{right}}$  
  -   $= \text{mod8\_gua}(P_{\text{left}})$  
  -   $= \text{mod8\_gua}(P_{\text{right}})$  
  -   $= \text{mod6\_yao}(P_{\text{left}} + P_{\text{right}})$    
- 
  -  “ ” “ ”  “ ” “ ” “ ” 

- $\text{mod}8\_gua$
- $\text{mod}6\_yao$  /  $\text{mod}8\_gua$

## 1.4.2 $\text{mod}8\_gua$

- $\text{mod}8\_gua$ 
  - $1 \text{ } \$W_1 \$ 2 \text{ } \$W_2 \$$
  - $\$ = \text{mod}8\_gua(W_1) \$$
  - $\$ = \text{mod}8\_gua(W_2) \$$
  - $\$ = \text{mod}6\_yao(W_1 + W_2) \$$   $\text{mod}8\_gua$

## 1.4.3 $\text{mod}8\_gua$

- $\text{mod}8\_gua$ 
  - $1 \text{ } \$W_1 \$ \text{mod}8\_gua(W_1) \$$
  - $2 \text{ } 3 \text{ } \$(W_2 + W_3) \$ \text{mod}8\_gua(W_2 + W_3) \$$
  - $\$ = \text{mod}6\_yao(W_1 + W_2 + W_3) \$$   $\text{mod}8\_gua$

## 1.4.4 $\text{mod}8\_gua$

- $\text{mod}8\_gua$  “ ”
- $\text{mod}8\_gua$   $\text{mod}6\_yao$  /  $\text{mod}8\_gua$   $\$ = 1 \$$   $\$ = 2 \$$   $\$ = 3 \$$   $\$ = 4 \$$
- $\text{mod}8\_gua$ 
  - $\text{mod}8\_gua$  **4, 6, 8, 10**  $\text{mod}8\_gua$ 
    - $\text{mod}8\_gua$   $\$Tone_{\{first\}} \$ \text{mod}8\_gua$   $\$Tone_{\{second\}} \$$
    - $\$ = \text{mod}8\_gua(Tone_{\{first\}}) \$$
    - $\$ = \text{mod}8\_gua(Tone_{\{second\}}) \$$
    - $\$ = \text{mod}6\_yao(Tone_{\{first\}} + Tone_{\{second\}}) \$$   $\text{mod}8\_gua$
  - $\text{mod}8\_gua$  **5, 7, 9**  $\text{mod}8\_gua$ 
    - $\text{mod}8\_gua$   $\$N \$ \text{mod}8\_gua$   $\$ = (N - 1) / 2 \$$   $\$ = (N + 1) / 2 \$$
    - $\text{mod}8\_gua$   $\$Tone_{\{first\}} \$ \text{mod}8\_gua$   $\$Tone_{\{second\}} \$$
    - $\$ = \text{mod}8\_gua(Tone_{\{first\}}) \$$
    - $\$ = \text{mod}8\_gua(Tone_{\{second\}}) \$$
    - $\$ = \text{mod}6\_yao(Tone_{\{first\}} + Tone_{\{second\}}) \$$   $\text{mod}8\_gua$
- $\text{mod}8\_gua$  “ ”
  - $\text{mod}8\_gua$
  - $\text{mod}8\_gua$ 
    - ①  $\text{mod}8\_gua$  /  $\text{mod}8\_gua$  ②
    - 1  $\text{mod}8\_gua$  1  $\text{mod}8\_gua$  2  $\text{mod}8\_gua$  3 ③

## 1.4.5 $\text{mod}8\_gua$

- $\text{mod}8\_gua$  “ ”

- $$N \geq 11$$
  - $$\text{mod8\_gua}(N/2) \neq \text{mod8\_gua}(N/2)$$

$$\text{mod6\_yao}(N) \neq$$
  - $$\text{mod8\_gua}((N-1)/2) \neq \text{mod8\_gua}((N+1)/2)$$

$$\text{mod6\_yao}(N) \neq$$
  - $$\text{mod8\_gua}(N/2) \neq \text{mod8\_gua}(N/2)$$

 1.5 

- **F1** `\text{mod8_gua}` `F2` `\text{mod8_gua}`
- **1.5.1** `\text{mod8_gua}`
  - `\text{mod8_gua}` `\text{mod8_gua}` `\text{mod8_gua}`
  - `\text{mod8_gua}` `\text{mod8_gua}` `\text{mod8_gua}`
  - `\text{Dong}` `\text{mod6_yao}` `\text{mod6_yao}` `\text{mod6_yao}`
  - `\text{mod6_yao}` `\text{mod6_yao}` `\text{mod6_yao}`
- **1.5.2** `\text{mod8_gua}`
  - `\text{mod8_gua}` `\text{mod8_gua}` `\text{mod8_gua}`
  - `\text{mod8_gua}` `\text{mod8_gua}` `\text{mod8_gua}`
  - `\text{Dong}` `\text{mod6_yao}` `\text{mod6_yao}` `\text{mod6_yao}` `\text{mod6_yao}`
  - `\text{mod6_yao}` `\text{mod6_yao}` `\text{mod6_yao}` `\text{mod6_yao}`

[illegible]

-  F1  F2 
- 
  1.   

  2.  (1)  (2)  (3)  (4)  (5)  
 (6)  (7)  (8) 
  3.  (1)  (4)  (3)  (6)  (7)   
(2) 
  4.  (1)  (8)  (6)  (3) 
  5.  /  (4/5)  (3)  /  (1/2)  (6)  /  (8/7) 
- 

1.7

- `F1` `F2`
- `"`
- `/` `$Gua {obj} \in [1, 8]$`

- $$\begin{aligned} & \$Gua_{\{dir\}} \in [1, 8] \$ \\ & \begin{aligned} & \begin{aligned} & = 3 \end{aligned} \end{aligned} \end{aligned}$$
    - $$\begin{aligned} & = 6 \end{aligned}$$
    - $$\begin{aligned} & = 4 \end{aligned}$$
    - $$\begin{aligned} & = 2 \end{aligned}$$
    - $$\begin{aligned} & = 5 \end{aligned}$$
    - $$\begin{aligned} & = 1 \end{aligned}$$
    - $$\begin{aligned} & = 7 \end{aligned}$$
    - $$\begin{aligned} & = 8 \end{aligned}$$
  - $$\begin{aligned} & \$T \in [1, 12] \$ \end{aligned}$$
- $$\begin{aligned} & \$ = Gua_{\{obj\}} \$ \end{aligned}$$
  - $$\begin{aligned} & \$ = Gua_{\{dir\}} \$ \end{aligned}$$
  - $$\begin{aligned} & \$ = \text{mod6\_yao}(Gua_{\{obj\}} + Gua_{\{dir\}} + T) \$ \end{aligned}$$

1.8

- $$\begin{aligned} & F1 \end{aligned}$$
  - $$\begin{aligned} & F2 \end{aligned}$$
- $$\begin{aligned} & \end{aligned}$$
- $$\begin{aligned} & \$K \$ \end{aligned}$$
  - $$\begin{aligned} & ID \end{aligned}$$
  - $$\begin{aligned} & \$Num_{\{upper\}} = (Y + M + D + K) \$ \end{aligned}$$
  - $$\begin{aligned} & \$Num_{\{lower\}} = (Y + M + D + K + T) \$ \end{aligned}$$
  - $$\begin{aligned} & \$Dong = \text{mod6\_yao}(Y + M + D + K + T) \$ \end{aligned}$$
- $$\begin{aligned} & (3) \end{aligned}$$
  - $$\begin{aligned} & (12) \end{aligned}$$
  - $$\begin{aligned} & (1) \end{aligned}$$
  - $$\begin{aligned} & (7) \end{aligned}$$
  - $$\begin{aligned} & \$3+12+1=16 \$ \end{aligned}$$
  - $$\begin{aligned} & 4 \end{aligned}$$
  - $$\begin{aligned} & \$ (16+4)=20 \pmod{8} = 4 \$ \end{aligned}$$
  - $$\begin{aligned} & \$ (20+7)=27 \pmod{8} = 3 \$ \end{aligned}$$
  - $$\begin{aligned} & 6 \end{aligned}$$
  - $$\begin{aligned} & \$ (16+6)=22 \pmod{8} = 6 \$ \end{aligned}$$
  - $$\begin{aligned} & \$ (22+7)=29 \pmod{8} = 5 \$ \end{aligned}$$
  - $$\begin{aligned} & 21 \end{aligned}$$
  - $$\begin{aligned} & \$ (16+21)=37 \pmod{8} = 5 \$ \end{aligned}$$
  - $$\begin{aligned} & \$ (37+7)=44 \pmod{8} = 4 \$ \end{aligned}$$
  - $$\begin{aligned} & \$44 \pmod{6} = 2 \$ \end{aligned}$$

2.1

6

1

6

2.2

|  | $$(\square + \square + \square + \square ) \pmod 6$$                                               |  | $\square \ 0 \square \ 6$ |
|--|----------------------------------------------------------------------------------------------------|--|---------------------------|
|  | $$(\square + \square ) \pmod 6$$                                                                   |  | $\square \ 0 \square \ 6$ |
|  | $$(\square + \square ) \pmod 6$$                                                                   |  | $\square \ 0 \square \ 6$ |
|  | $(\square \square \square \square \square \square \square \square ) \pmod 6$$                      |  | $\square \ 0 \square \ 6$ |
|  | $\square \square \square \square \square \square \square \square \square \pmod 6$$                 |  | $\square \ 0 \square \ 6$ |
|  | $$(\square + \square ) \pmod 6$$                                                                   |  | $\square \ 0 \square \ 6$ |
|  | $$(\square + \square + \square ) \pmod 6$$                                                         |  | $\square \ 0 \square \ 6$ |
|  | $$(\square \square \square \square + \square \square \square \square + \square \square ) \pmod 6$$ |  | $\square \ 0 \square \ 6$ |
|  | $$(\square + \square + \square + \square + \square ) \pmod 6$$                                     |  | $\square \ 0 \square \ 6$ |

2.3

- 
- 

3.1

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-

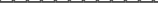
- [illegible]

- 3.3 □□□□□□      “□□□□□□□□□□”

- ```
if aa is aaa or aa is bbb:
    # aa "aaaaaaaaaa" aaaa
    aaa = aaa [02, 03, 04]
    aaa = aaa [03, 04, 05]
else:
    # aaaaaaa
    aaa = aaa [02, 03, 04]
    aaa = aaa [03, 04, 05]
```

- |              |  |
|--------------|--|
| [ ][ ][ ][ ] |  |
|--------------|--|

☐ ☐      3.4 ☐☐☐☐☐☐

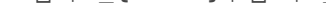
- 1. 
  - 2. 
  - 3. 
- 
    - 
    - 

[illegible]

1

4.1

[illegible]

1.   $\$E_{\{other\}} \$E_{\{ti\}}$
2.   $\$E_{\{other\}} == E_{\{ti\}}$
3.   $\$E_{\{ti\}} \$E_{\{other\}}$  / 
4.   $\$E_{\{ti\}} \$E_{\{other\}}$  / 
5.   $\$E_{\{other\}} \$E_{\{ti\}}$  

## 4.2

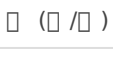
[illegible]

1

[illegible]

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|                                                                                       |                                                                                                                                                                            |                                                                                                                                                                            |                                                                                                                                                                            |                                                                                                                                                                                |                                                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                       |  (  /  ) |  (  )                                                                                     |  (  )                                                                                     |  (  /  ) |  (  /  ) |
|                                                                                       |  (  )                                                                                     |  (  /  ) |  (  /  ) |  (  )                                                                                       |  (  /  ) |
|                                                                                       |  (  /  ) |  (  )                                                                                     |  (  /  ) |  (  )                                                                                       |  (  /  ) |
| <br> |  (  /  ) |  (  /  ) |  (  )                                                                                     |  (  /  ) |  (  )                                                                                       |

## 4.3

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  - 
  - 
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  - 
  - 
-  
  - 
    -  /   $\implies$  
    -  /   $\implies$  

## 

-   F1   F2 
- 

## 5.1

-    $\text{\$Sum\_all} = \text{\text{\{array of 4 empty boxes\}}} + \text{\text{\{array of 4 empty boxes\}}} + \text{\text{\{array of 4 empty boxes\}}} + \text{\text{\{array of 4 empty boxes\}}} + \text{\text{\{array of 4 empty boxes\}}}$   

-  
  -    $\text{\$}\text{\text{\{array of 2 empty boxes\}}} \text{TimeCount} = \lfloor \text{Sum\_all} / 2 \rfloor \text{\text{\{array of 2 empty boxes\}}} \text{Sum\_all} / 2$
  -    $\text{\$}\text{\text{\{array of 2 empty boxes\}}} \text{TimeCount} = \text{Sum\_all} \times 2$

-    $\text{TimeCount} = \text{Sum}_{\{\text{all}\}}$
-  

## 5.2

  $\text{TimeCount}$  

- 
  -   
-  / 
  -   
- 
  -   

## 5.3





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  - 
  -    
  

- 
  - 
  -    

-  



-   $F1$    $F2$   


## 6.1

-  



| 步骤 | 数据 | 初始化    | 数据     | 【初始化】  | 【      |
|----|----|--------|--------|--------|--------|
| 2  | 数据 | 数据 “ ” | 数据 “ ” | 数据     | 数据     |
| 3  | 数据 | 数据     | 数据     | 数据     | 数据     |
| 4  | 数据 | 数据 “ ” | 数据 “ ” | 数据 “ ” | 数据 “ ” |
| 5  | 数据 | 数据     | 数据     | 数据     | 数据     |
| 6  | 数据 | 数据 “ ” | 数据 “ ” | 数据     | 数据     |
| 7  | 数据 | 数据     | 数据     | 数据     | 数据 5x5 |
| 8  | 数据 | 数据     | 数据     | 数据     | 数据     |

Python

Python

Python

```
# coding: utf-8
from dataclasses import dataclass
from typing import Tuple, List

# 数据
BAGUA_NAMES = ["", " ", " ", " ", " ", " ", " ", " ", " "]
```

```
BAGUA_ELEMENTS = ["", "☯", "☰", "☷", "☵", "☶", "☴", "☱", "☲"]
```

```
# 00000000: 0, 1: 000000000000[00, 00, 00]
```

```
BAGUA_YAO = {
    1: [1, 1, 1], # ☰ (00)
    2: [1, 1, 0], # ☶ (00, 00, 00)
    3: [1, 0, 1], # ☱ (00, 00, 00)
    4: [1, 0, 0], # ☷ (00, 00, 00)
    5: [0, 1, 1], # ☵ (00, 00, 00)
    6: [0, 1, 0], # ☴ (00, 00, 00)
    7: [0, 0, 1], # ☳ (00, 00, 00)
    8: [0, 0, 0], # ☰ (00)
}
```

```
def mod8_gua(n: int) -> int:
    r = n % 8
    return 8 if r == 0 else r
```

```
def mod6_yao(n: int) -> int:
    r = n % 6
    return 6 if r == 0 else r
```

```
def get_gua_by_yao(yao: List[int]) -> int:
    for g, y in BAGUA_YAO.items():
        if y == yao:
            return g
    return 8
```

```
@dataclass
class HexagramResult:
    upper_gua: int          # 00000 (1-8)
    lower_gua: int          # 00000 (1-8)
    dong_yao: int          # 000 (1-6)
    ti_gua: int            # 00000 (1-8)
    yong_gua: int          # 00000 (1-8)
    ti_is_upper: bool      # 00000000
    hu_upper: int          # 000000 (1-8)
    hu_lower: int          # 000000 (1-8)
    bian_upper: int        # 00000000 (1-8)
    bian_lower: int        # 00000000 (1-8)
```

```

def deduce_meihua(upper: int, lower: int, dong: int) -> HexagramResult:
    # 1. ䷀䷁䷂ (䷀䷁䷂, ䷀0䷁5)
    six_lines = BAGUA_YAO[lower] + BAGUA_YAO[upper]

    # 2. ䷀䷁ (䷀䷁䷂䷃䷄䷅䷆䷇䷈䷉䷊䷋䷌䷍䷎䷏)
    if dong in [1, 2, 3]:
        ti_gua = upper
        yong_gua = lower
        ti_is_upper = True
    else:
        ti_gua = lower
        yong_gua = upper
        ti_is_upper = False

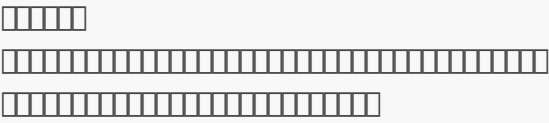
    # 3. ䷀䷁ (䷀䷁䷂䷃䷄䷅䷆䷇䷈䷉䷊䷋䷌䷍䷎䷏)
    bian_lines = list(six_lines)
    target_idx = dong - 1
    bian_lines[target_idx] = 1 if bian_lines[target_idx] == 0 else 0
    bian_lower = get_gua_by_yao(bian_lines[0:3])
    bian_upper = get_gua_by_yao(bian_lines[3:6])

    # 4. ䷀䷁䷂䷃䷄䷅䷆䷇䷈䷉䷊䷋䷌䷍䷎䷏“䷀䷁䷂䷃䷄䷅䷆䷇䷈䷉䷊䷋䷌䷍䷎䷏”䷀䷁䷂
    if (upper == 1 and lower == 1) or (upper == 8 and lower == 8):
        # ䷀䷁䷂䷃䷄䷅䷆䷇䷈䷉䷊䷋䷌䷍䷎䷏
        hu_lower = get_gua_by_yao([bian_lines[1], bian_lines[2], bian_lines[3]])
        hu_upper = get_gua_by_yao([bian_lines[2], bian_lines[3], bian_lines[4]])
    else:
        # ䷀䷁ (䷀䷁䷂䷃䷄䷅䷆䷇䷈䷉䷊䷋䷌䷍䷎䷏)
        hu_lower = get_gua_by_yao([six_lines[1], six_lines[2], six_lines[3]])
        hu_upper = get_gua_by_yao([six_lines[2], six_lines[3], six_lines[4]])

    return HexagramResult(
        upper_gua=upper,
        lower_gua=lower,
        dong_yao=dong,
        ti_gua=ti_gua,
        yong_gua=yong_gua,
        ti_is_upper=ti_is_upper,
        hu_upper=hu_upper,

```

```
    hu_lower=hu_lower,  
    bian_upper=bian_upper,  
    bian_lower=bian_lower  
)
```

“

[illegible]

|  |  |  |  |  |
|--|--|--|--|--|
|  |  |  |  |  |
|--|--|--|--|--|

[illegible][illegible]

Diagram illustrating a file system structure for a mathematical engine specification:

- Root directory: `Mathematical Engine Specification`
  - Subdirectory: `Mathematical Engine Specification`
    - File: `Mathematical Engine Specification`
    - File: `Mathematical Engine Specification`
    - File: `Mathematical Engine Specification`
    - File: `Mathematical Engine Specification`
  - File: `Mathematical Engine Specification`

[illegible]

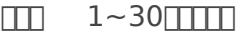
|  |  |
|--|--|
|  |  |
|--|--|

\*\*\*"\_\_\_\_\_

”\*\*





- 
  - 
  -  1~30  (1)  (30) 
  -  31~60  (31)  (60) 
  -  61~90  (1)  (30) 
  -  91~120  (31)  (60) 
  - 

### 3.

-   $S\_global \in [1, 4320]$  
-   $s\_local \in [1, 12]$   

-   $S\_global = (Y\_global - 1) \times 12 + s\_local$  
-  
  -  30 
  -   **$S\_global \% 2 == 1$**    **(1)**  **(30)**  

  -   **$S\_global \% 2 == 0$**    **(31)**    
**(60)** 
  -  60  360 

## 2.2

  $N\_year \in [1, 129600]$  

- $H = (N\_year - 1) // 10800 + 1$  (  $[1, 12]$ )
- $Y\_global = (N\_year - 1) // 360 + 1$  (  $[1, 360]$ )
- $S\_global = (N\_year - 1) // 30 + 1$  (  $[1, 4320]$ )
- $YearInShi = (N\_year - 1) \% 30 + 1$  (  $[1, 30]$ )
- $s\_local = (S\_global - 1) \% 12 + 1$  (  $\sim$   )
- $y\_local = (Y\_global - 1) \% 30 + 1$

  $GZ \in [0, 59]$  

-   $S\_global$    $GZ = YearInShi - 1$   0  29 
-   $S\_global$    $GZ = YearInShi + 29$   30  59 

## 2.3

## Anchor Points



000000001800000000  
└─ 0214900000 0215500000000000  
└─ 02156000000000001100000000— 000000000002357000  
|  
000000001810000000000000  
└─ 0216100000 02172000000000  
└─ 0182000000000000  
└─ 0183000000000000  
└─ 0184000000000000  
└─ 02266000000000002700000000— 00000000000960000

00000000000000000000000000000000

| 0000            | 000000                       | 000000    | 00000 N_year | 00000                    |
|-----------------|------------------------------|-----------|--------------|--------------------------|
| 000000          | 00 · 0 1800 · 0 2156<br>0000 | 0 1100000 | 64,661       | 000 2357 0 (BCE<br>2357) |
| 00000           | 00 · 0 1800 · 0 2158<br>0000 | 0 2100000 | 64,731       | 000 2287 0 (BCE<br>2287) |
| 00000           | 00 · 0 1800 · 0 2159<br>0000 | 0 2400000 | 64,764       | 000 2254 0 (BCE<br>2254) |
| 00000           | 00 · 0 1820 · 0 2176<br>0000 | 0 1600000 | 65,266       | 000 1752 0 (BCE<br>1752) |
| 000000          | 00 · 0 1830 · 0 2197<br>0000 | 0 1600000 | 65,896       | 000 1122 0 (BCE<br>1122) |
| 000000          | 00 · 0 1840 · 0 2266<br>0000 | 0 2700000 | 67,977       | 00 960 0 (CE<br>960)     |
| 000000<br>00000 | 00 · 0 1840 · 0 2267<br>0000 | 0 1400000 | 68,094       | 00 1077 0 (CE<br>1077)   |

00000000000000000000000000000000

Offset = 670170

0000000000 0 00000 1 000000 1 00

- 0000 CE 0 00000 N\_year0
  - 000000 CE > 000 N\_year = CE + 67017
  - 000000 BCE > 000 N\_year = 67018 - BCE
- 00000 N\_year 0 0000 0
  - 0 N\_year > 670170 000 CE = N\_year - 67017
  - 0 N\_year <= 670170 000 BCE = 67018 - N\_year



- [illegible]

- 12 B 5 12 × 5 = 60
- [ ] A

### 3.3 360

- 360
  - 360
  - 360 6 × 360 = 2,160
  - Y ∈ [1, 360]
    - Gualdx = (Y - 1) // 6 ∈ [0, 59] Gualdx + 1
    - Yaoldx = (Y - 1) % 6 + 1 ∈ [1, 6]
    - Gualdx + 1
    - Yaoldx
- [ ] 2
  - " "
  - [ ] " "

### 3.4 4320

12 360 12

- [ ] 3
  - A
    - 6 1~6
    - 6 7~12
  - B
    - 30 360
  - C
    - 12 30 360
  - [ ] A

### 3.5 129600

30

- [ ] 4
  - 60

-  ... 
-  ... 
-  60 
-  
-  5   $6 \times 5 = 30$  
-   “  ”  
- “  ” 

“ ” “ ”

□□□□□□  
(21,600□)

- [illegible]

-   $N_{\text{kaiwu}} = 27,000$
  -   $N_{\text{biwu}} = 113,400$
  -   $\Delta T_{\text{active}} = N_{\text{biwu}} - N_{\text{kaiwu}} = 113,400 - 27,000 = 86,400$
-   $8 \times 10,800$    

- $\Delta T_{\text{inactive}} = 129,600 - 86,400 = 43,200$  4
- $4 \times 10,800$
- $N_{\text{year}} = 2026 + 67017 = 69,043$
- $H = (69043 - 1) // 10800 + 1 = 7$
- $Y = (69043 - 1) // 360 + 1 = 192$
- $S = (69043 - 1) // 30 + 1 = 2302$
- 13
- $69,043 - 27,000 = 42,043$
- $113,400 - 69,043 = 44,357$
- 



1837-1865 1923-1935 2105-2113

# 5.1

“ 1857

|          |          | 1-10 | $4 \times 10 = 40$   |  |
|----------|----------|------|----------------------|--|
|          |          | 1-12 | $4 \times 12 = 48$   |  |
| $\times$ | $\times$ | 10   | $16 \times 10 = 160$ |  |
| $\times$ | $\times$ | 12   | $16 \times 12 = 192$ |  |


 “” “” 
 160 
 48 
**112** 

192 
 40 
**152** 

$$\begin{aligned} \square\square\square\square &= 160 \times 192 = 30,720 \\ \square\square\square\square &= 160 - 48 = 112 \\ \square\square\square\square &= 192 - 40 = 152 \\ \square\square\square\square &= 112 \times 152 = 17,024 \\ \square\square\square\square &= 152 \times 112 = 17,024 \\ \square\square\square\square &= 17,024 \times 17,024 = 289,816,576 \end{aligned}$$

[illegible]

## 5.2

| □   | □□□                 | □□□                  | □□□□                     |
|-----|---------------------|----------------------|--------------------------|
| □□  | □□□□□               | tone = 1□ 2□ 3□ 4    | □□□□□□□□<br>□□ 4 × 4 □□□ |
| □□□ | □□□□□               | opening = 1□ 2□ 3□ 4 | □□□□□□□□<br>□□ 4 × 4 □□□ |
| □□□ | □□□□□□□□<br>□□□□    | voice = 1...10       | □□□□□□                   |
| □□□ | □□□□□□□□<br>□□□□□□□ | sound = 1...12       | □□□□□□□                  |
| □□  | □□ / □□             | odd / even           | □□□□□□□□ /<br>□          |
| □□  | □ / □               | open / closed        | □□□□□□□□<br>□□□ /□□      |

  $4 \times \text{100}$   $\times \text{400}$  = 160   $4 \times \text{100}$   $\times \text{1600}$  =  
 192  112  152   $10 \times 12 =$   
 120  "100"   $12 \times 10 = 120$   "100"   $\div \text{100000000}$   $16 \times 240 = \mathbf{3,840}$    
 151-153  1861-1863 

### 5.3

```

sky = (sky ∈ {0,1,2,3}, tone ∈ {0,1,2,3}, voice ∈ 1..10)
earth = (earth ∈ {0,1,2,3}, opening ∈ {0,1,2,3}, sound ∈ 1..12)

```



1. sky tone earth opening
2. voice sound
- 3.
- 4.
- 5.
6. use\_voice\_index use\_sound\_index usable=false
7. animal\_number = use\_voice\_index \* use\_sound\_index 1-17,024

[illegible]

/ / 1850-1851

## 5.4

[illegible][illegible]

”□ 2105-2107

| ㄅ | ㄆ | ㄇ |
|---|---|---|
| ㄅ | ㄆ | ㄇ |
| ㄅ | ㄆ | ㄇ |
| ㄅ | ㄆ | ㄇ |
| ㄅ | ㄆ | ㄇ |

|       |                       |
|-------|-----------------------|
| □□□□□ | (yuan, hui, yun, shi) |
|-------|-----------------------|

[illegible]

yun\_gua(year)  /

[illegible]5.5 

|  |  |  |  |
|--|--|--|--|
|  |  |  |  |
|--|--|--|--|

- 

- “ ” tone=1..4  “ ”opening=1..4  
 /
-  /  
  

-  1837-1859 1861-1867 1923-1935 2105-2113 1853-1855  
 /



# Python

```
# coding: utf-8

from dataclasses import dataclass
from typing import Tuple, Dict, Any

# 1. 字表
TIAN_GAN = ["", "甲", "乙", "丙", "丁", "戊", "己", "庚", "辛", "壬", "癸"]
DI_ZHI = ["", "子", "丑", "寅", "卯", "辰", "巳", "午", "未", "申", "酉", "戌", "亥"]

# 六十甲子
SIXTY_JIAZI = [
    "甲子", "乙丑", "丙寅", "丁卯", "戊辰", "己巳", "庚午", "辛未", "壬申", "癸酉",
    "甲戌", "乙亥", "丙子", "丁丑", "戊寅", "己卯", "庚辰", "辛巳", "壬午", "癸未",
    "甲申", "乙酉", "丙戌", "丁亥", "戊子", "己丑", "庚寅", "辛卯", "壬辰", "癸巳",
    "甲午", "乙未", "丙申", "丁酉", "戊戌", "己亥", "庚子", "辛丑", "壬寅", "癸卯",
    "甲辰", "乙巳", "丙午", "丁未", "戊申", "己酉", "庚戌", "辛亥", "壬子", "癸丑",
    "甲寅", "甲辰", "甲午", "甲申", "甲戌", "甲子", "甲寅", "甲辰", "甲午", "甲申"
]

# 六十甲子纳音
HUI_GUA = ["", "甲子", "乙丑", "丙寅", "丁卯", "戊辰", "己巳", "庚午", "辛未", "壬申", "癸酉", "甲戌", "乙亥"]

# 六十甲子纳音
SIXTY_ROUND_GUA = [
    # 六十甲子

```

```

"0", "0", "0", "0", "0", "00", "0", "00", "00", "0",
"00", "00", "0", "0", "00", "0", "0", "0", "00", "00",
"0", "0", "0", "0", "00", "0", "00", "00", "00", "0",
# 00000
"0", "00", "0", "0", "0", "0", "0", "0", "0", "0",
"00", "0", "0", "0", "0", "0", "0", "0", "00", "0",
"0", "0", "0", "0", "0", "0", "0", "0", "0", "0"
]

```

```

# 00000000000000000000
CE_OFFSET = 67017

```

```

@dataclass
class HuangjiCoordinate:
    absolute_year: int    # 000000 [1, 129600]
    hui_index: int        # 000 [1, 12]
    hui_name: str         # 000 (0~0)
    hui_gua: str          # 00 (0000)
    yun_global: int       # 00000 [1, 360]
    yun_local: int        # 00000 [1, 30]
    yun_gua: str          # 000
    yun_yao: int          # 00000 [1, 6]
    shi_global: int       # 00000 [1, 4320]
    shi_local: int        # 00000 [1, 12]
    shi_name: str         # 000 (0~0)
    year_in_shi: int      # 00000 [1, 30]
    ganzhi: str           # 0000
    year_gua: str         # 00000 (00000000)
    is_kaiwu: bool        # 0000000000
    ce_year: int          # 0000 (00000000)

```

```

class HuangjiEngine:
    @staticmethod
    def ce_to_absolute_year(ce: int) -> int:
        # 000000000000
        if ce > 0:
            return ce + CE_OFFSET
        elif ce < 0:
            return 67018 + ce
        else:

```

```
raise ValueError("0000000000000000 -1 000001001 0000100")
```

```
@staticmethod
```

```
def absolute_year_to_ce(ay: int) -> int:
```

```
    # 000000000000
```

```
    if ay > CE_OFFSET:
```

```
        return ay - CE_OFFSET
```

```
    else:
```

```
        return ay - 67018
```

```
@classmethod
```

```
def calculate(cls, absolute_year: int) -> HuangjiCoordinate:
```

```
    # 000000000000000000000000
```

```
    if not (1 <= absolute_year <= 129600):
```

```
        raise ValueError("00000000 [1, 129600] 000")
```

```
    ay = absolute_year
```

```
    # 1. 000
```

```
    h_idx = (ay - 1) // 10800 + 1
```

```
    h_name = DI_ZHI[h_idx]
```

```
    h_gua = HUI_GUA[h_idx]
```

```
    # 2. 000
```

```
    y_global = (ay - 1) // 360 + 1
```

```
    y_local = (y_global - 1) % 30 + 1
```

```
    # 0000000000600000000000600000
```

```
    gua_idx = (y_global - 1) // 6
```

```
    yao_idx = (y_global - 1) % 6 + 1
```

```
    y_gua = SIXTY_ROUND_GUA[gua_idx]
```

```
    # 3. 000
```

```
    s_global = (ay - 1) // 30 + 1
```

```
    s_local = (s_global - 1) % 12 + 1
```

```
    s_name = DI_ZHI[s_local]
```

```
    # 4. 000000
```

```
    year_in_shi = (ay - 1) % 30 + 1
```

```
    if s_global % 2 == 1:
```

```

        # 0~29
        gz_idx = year_in_shi - 1
    else:
        # 30~59
        gz_idx = year_in_shi + 29
    ganzhi_str = SIXTY_JIAZI[gz_idx]

    #
    year_gua_str = SIXTY_ROUND_GUA[gz_idx]

    # 5. (27000~113400)
    is_kaiwu_status = (27000 <= ay <= 113400)

    # 6.
    ce = cls.absolute_year_to_ce(ay)

    return HuangjiCoordinate(
        absolute_year=ay,
        hui_index=h_idx,
        hui_name=h_name,
        hui_gua=h_gua,
        yun_global=y_global,
        yun_local=y_local,
        yun_gua=y_gua,
        yun_yao=yao_idx,
        shi_global=s_global,
        shi_local=s_local,
        shi_name=s_name,
        year_in_shi=year_in_shi,
        ganzhi=ganzhi_str,
        year_gua=year_gua_str,
        is_kaiwu=is_kaiwu_status,
        ce_year=ce
    )

#
if __name__ == "__main__":
    engine = HuangjiEngine()

    # (2357)

```

```
yao_ay = 64661
res_yao = engine.calculate(yao_ay)
print(f"aaaa(64661): a={res_yao.hui_name}, a={res_yao.yun_global}, a
={res_yao.shi_global}({res_yao.shi_name}), aa={res_yao.year_in_shi}, aa={res_yao.ganzhi}")
assert res_yao.ganzhi == "aa", "aaaaaaaaaaaa"
assert res_yao.shi_global == 2156, "aaaaaaaaaaaa2156aa"
assert res_yao.yun_global == 180, "aaaaaaaaaaaa180aa"
assert res_yao.ce_year == -2357, "aaaaaaaaaaaa2357aa"

# aaaaaaaa (aa960a)
song_ay = 67977
res_song = engine.calculate(song_ay)
print(f"aaaa(67977): a={res_song.hui_name}, a={res_song.yun_global}, a
={res_song.shi_global}({res_song.shi_name}), aa={res_song.year_in_shi}, aa={res_song.ganzhi}")
assert res_song.ganzhi == "aa", "aaaaaaaaaaaa"
assert res_song.shi_global == 2266, "aaaaaaaaaaaa2266aa"
assert res_song.ce_year == 960, "aaaaaaaaaaaa960aa"

# aaaa2026a (aaaa)
ay_2026 = 69043
res_2026 = engine.calculate(ay_2026)
print(f"aa2026a(69043): a={res_2026.hui_name}, a={res_2026.yun_global}, a
={res_2026.shi_global}({res_2026.shi_name}), aa={res_2026.year_in_shi}, aa={res_2026.ganzhi}")
assert res_2026.ganzhi == "aa", "aa2026aaaaaaaa"
assert res_2026.ce_year == 2026, "aaaaaa2026aa"

print("aaaaaaaaaaaaaaaaaaaa")
```



| aa   | aaaaaaaa                            | aaaaaaaaaaaaaa               |
|------|-------------------------------------|------------------------------|
| aaaa | 12a 30aaaaaa 12aa 30aa<br>12aa 30aa | aaaaaa<br>aaaaaaaaaaaaaa     |
| aaaa | aaaaaaaaaaaa                        | aaaaaa<br>aaaaaaaaaaaaaaaaaa |

| 項目 | 計算式                         | 計算結果                                         |
|----|-----------------------------|----------------------------------------------|
| 総額 | 総額 / 年 vs                   | 総額 / 年<br>総額<br>総額                           |
| 総額 | 総額 360 vs                   | 総額 Gualdx =<br>(Y-1)//6 Yaoldx = (Y-1)%6 + 1 |
| 総額 | 総額 12 vs                    | 総額 12                                        |
| 総額 | 総額 vs                       | 総額                                           |
| 総額 | 総額 27000<br>総額 113400<br>総額 | 総額 8<br>86,400                               |
| 総額 | 総額                          | 総額                                           |

[illegible]

|  |  |  |  |  |
|--|--|--|--|--|
|  |  |  |  |  |
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[illegible][illegible][illegible]

|  |  |  |  |  |  |
|--|--|--|--|--|--|
|  |  |  |  |  |  |
|--|--|--|--|--|--|

“ ”

|  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|

[illegible][illegible]graph TD

```
subgraph 子图.子图
```

```

Sys1["□□□□□□□□□□<br/>□12□·□□□□·129,600□□□□□□□"]
Sys2["□□□□□□□□□□<br/>□360□·□□□□□□□□·□□□□□"]
Sys3["□□□□□□□□□□□□□□□□<br/>□4320□·□□□□·□□□□□□□"]

end

subgraph □□□□□□□□□□·□□□□□□□□
  Sys4["□□□□□□□□□□□□□□<br/>□□□□□□·□□□□□□□□□·289,816,576□□□□□"]
end

Sys1 --> Sys2
Sys2 --> Sys3
Sys1 -. -> |□□□□□□□□□□ vs □□□□□| Sys4
Sys2 -. -> |□□□□□□□□129,600 vs □□30,720| Sys4
Sys3 -. -> |□□□□□□□□□□ □1□2□3□4| Sys4

```

- [illegible]



1.1 

|  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|



1. 
- 
  - 
  - 
2. 
-   
  




| 数据 | 数据 | 数据 | 数据 | 数据      | 数据 | 数据<br>数据     |
|----|----|----|----|---------|----|--------------|
| 数据 | 数据 | 数据 | 数据 | 数据 / 数据 | 数据 | 数据<br>数据 ... |

- 数据
  - 数据 7 数据 3 数据
  - 数据 数据 6 数据
  - 数据 10数据 160数据

## 2.2 数据 . 数据 . 数据

数据

| 数据 | 数据 | 数据 | 数据       | 数据      | 数据 | 数据<br>数据     |
|----|----|----|----------|---------|----|--------------|
| 数据 | 数据 | 数据 | 数据<br>数据 | 数据 / 数据 | 数据 | 数据<br>数据 ... |
| 数据 | 数据 | 数据 | 数据<br>数据 | 数据 / 数据 | 数据 | 数据<br>数据 ... |
| 数据 | 数据 | 数据 | 数据<br>数据 | 数据 / 数据 | 数据 | 数据<br>数据 ... |
| 数据 | 数据 | 数据 | 数据<br>数据 | 数据 / 数据 | 数据 | 数据<br>数据     |

- 数据
  - 数据 9 数据 3
  - 数据 数据 数据 4 数据
  - 数据 12数据 192数据

数据

数据

数据

\*\*"数据"\*\*\*

## 3.1 数据

-  10  10  10  10   
 ○   =  $(10 + 10 + 10 + 10) * 4 = 160$
-  12  12  12   
 ○   =  $(12 + 12 + 12 + 12) * 4 = 192$
-   =  $160 * 192 = 30,720$   


## 3.2

## 112 152

 “  
  
”

-    
 ○  160  12   $12 * 4 = 48$    
 ○  =  $160 - 48 = 112$  
-    
 ○  192  10   $10 * 4 = 40$    
 ○  =  $192 - 40 = 152$  
-    
 ○   $160 + 192 = 352$    
 ○   $112 + 152 = 264$  



## 4.1



1.  •    
 •  112  152   () =  $112 * 152 = 17,024$   
 • 
2.  •    
 •  152  112   () =  $152 * 112 = 17,024$   
 • 

289,816,576□

$$17,024 = 289,816,576 \square\square \quad \square\square\square\square\square\square\square\square\square\square\square\square$$
$$\begin{array}{|c|c|c|} \hline & & \\ \hline \end{array} = 17,024 *$$
[illegible]

“

[illegible][illegible][illegible]

2

### 4.3

-    $7 \times 152 = 1,064$  
-    $9 \times 112 = 1,008$  
-   $3,840 \times 10 = 38,400$  

|  |  |  |
|--|--|--|
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[illegible]

5.1  “”  “” ”

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|  | <br> | <br> |  |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|

|    |                            |                                     |         |
|----|----------------------------|-------------------------------------|---------|
| 項目 | 数量<br>個                    | 数量<br>個                             | 数量<br>個 |
| 数量 | 数量 27,000 個<br>数量          | 数量<br>数量                            | 数量      |
| 数量 | 数量<br>数量 8個<br>数量 86,400 個 | 数量 9個 / 70個<br>数量 264 個 7<br>数量 9 個 | 数量      |
| 数量 | 数量 113,400<br>数量 数量        | 数量<br>数量                            | 数量      |
| 数量 | 数量<br>数量<br>43,200 個       | 数量<br>数量 3<br>数量                    | “数量”    |

数量 “

数量

数量 ”

数量

数量

数量 2/3 数量 1/3 数量

5.2 数量

数量 数量

1数量 2数量 3数量 4数量 数量

1. 数量 1数量

2. 数量 2数量

3. 数量 3数量

4. 数量 4数量

数量

数量 数量

数量

6.1 数量 Python / Pydantic 数量

```
# coding: utf-8
from dataclasses import dataclass
```

```

from typing import List, Dict, Optional
from enum import Enum

class TianShengTone(Enum):
    PING = "平" # 阴平 · 一
    SHANG = "上" # 阴上 · 二
    QU = "去" # 阴去 · 三
    RU = "入" # 阴入 · 四

class DiYinMouth(Enum):
    KAI = "开" # 阴开 · 一
    FA = "发" # 阴发 · 二
    SHOU = "收" # 阴收 · 三
    BI = "闭" # 阴闭 · 四

@dataclass(frozen=True)
class TianShengEntity:
    index: int # 1 ~ 16
    char: str # 普通话四声, 阴, 阳, 阴
    tone: TianShengTone # 阴 / 阳 / 阴 / 阳
    pishi: str # 阴 / 阳
    is_usable: bool # 是否可用 (True, False)

@dataclass(frozen=True)
class DiYinEntity:
    index: int # 1 ~ 16
    char: str # 普通话四声, 阴, 阳, 阴
    mouth: DiYinMouth # 阴 / 阳 / 阴 / 阳
    qingzhuo: str # 阴 / 阳
    is_usable: bool # 是否可用 (True, False)

@dataclass(frozen=True)
class HuangjiSoundHarmonicResult:
    tian_sheng: TianShengEntity
    di_yin: DiYinEntity
    is_harmonic: bool # 是否和谐 (True)
    tian_chang_bian: int # 天数 (7 * 152 = 1064 天)
    di_he_hua: int # 地合化 (9 * 112 = 1008 天)
    tong_shu: int # 总数 (289,816,576)

```

6.2 断言

Invariant Assertions

测试用例

```
def test_huangji_sound_invariants():  
    # 1. 断言  
    TI_YANG = (10 + 10 + 10 + 10) * 4 # 160  
    TI_YIN = (12 + 12 + 12 + 12) * 4 # 192  
    assert TI_YANG == 160  
    assert TI_YIN == 192  
  
    YONG_YANG = TI_YANG - (12 * 4) # 160 - 48 = 112  
    YONG_YIN = TI_YIN - (10 * 4) # 192 - 40 = 152  
    assert YONG_YANG == 112  
    assert YONG_YIN == 152  
  
    # 2. 断言  
    ALL_NUMBER = TI_YANG * TI_YIN  
    assert ALL_NUMBER == 30720  
  
    # 3. 断言  
    DONG_SHU = YONG_YANG * YONG_YIN  
    ZHI_SHU = YONG_YIN * YONG_YANG  
    assert DONG_SHU == 17024  
    assert ZHI_SHU == 17024  
  
    # 4. 断言  
    TONG_SHU = DONG_SHU * ZHI_SHU  
    assert TONG_SHU == 289816576 # 断言
```

测试用例

测试用例

1. 断言
2. 断言

3.    “ ” “ ”

4.

“ ”