



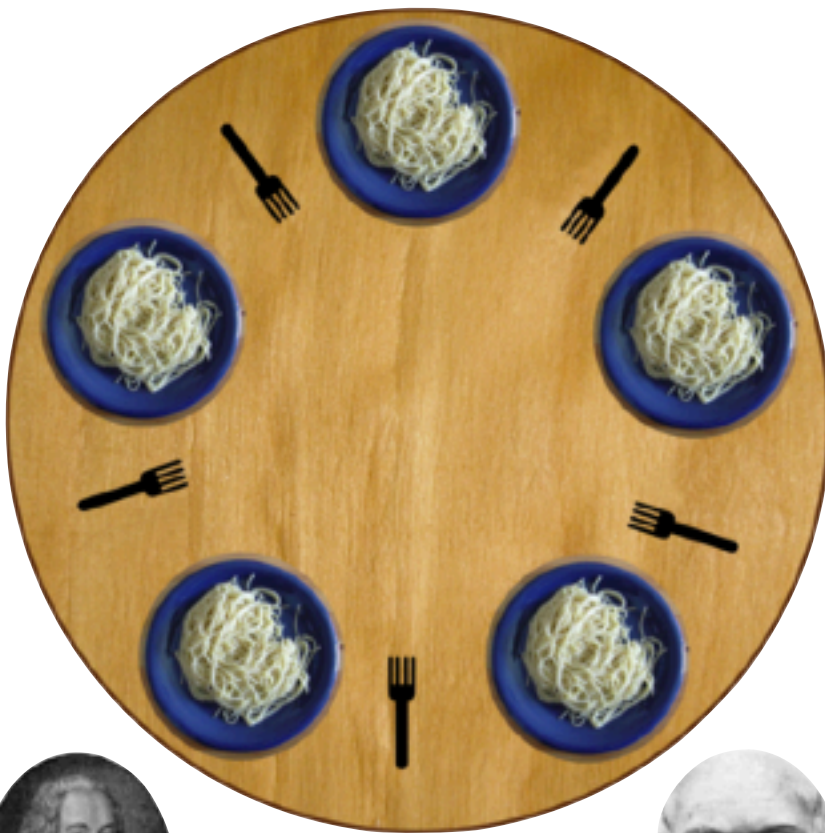
(Bad) Dining Philosophers



```
void philosopher (i, n) {  
    while(1) {  
        sem_wait(fork[i])  
        sem_wait(fork[(i + 1) % n])  
        eat & think  
        sem_signal(fork[i])  
        sem_signal(fork[(i + 1) % n])  
    }  
}
```

```
for (i=0, i<n, i++) {  
    sem_init(fork[i], 1)  
}
```

◉ **Deadlock** when each philosopher  
take the first fork "at the same time"



# (Bad) Dining Philosophers



```
for(i=0, i<n, i++){  
    sem_init(&fork[i], 1)  
}
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```
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    while(1) {  
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        sem_wait(&fork[(i + 1) % n])  
        eat & think  
        sem_signal(&fork[i])  
        sem_signal(&fork[(i + 1) % n])  
    }  
}
```

- ◎ **Deadlock** when each philosopher take the first fork "at the same time"



# (Good) Dining Philosophers

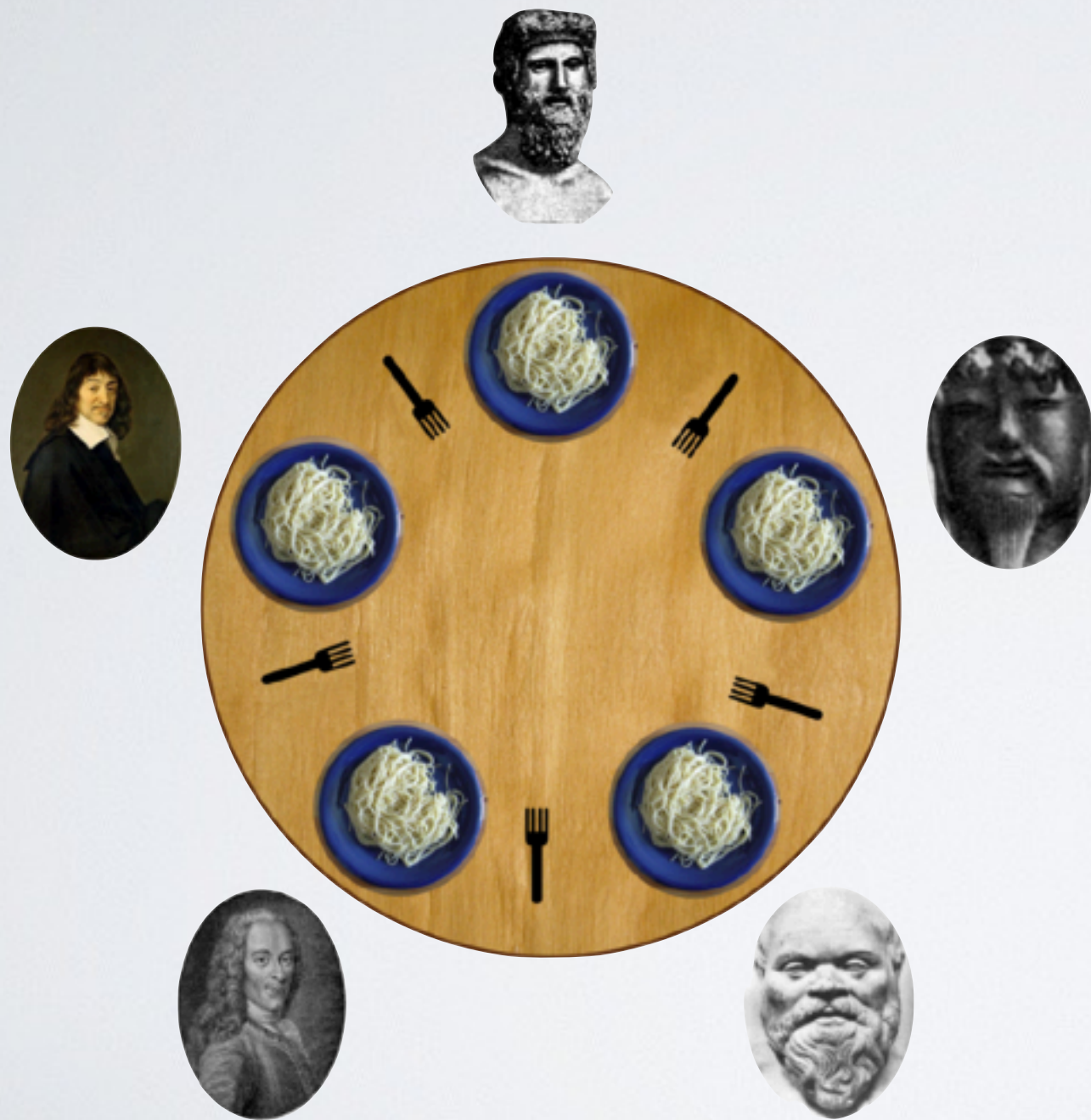


image from wikipedia

```
for(i=0, i<n, i++){  
    init(fork[i], 1)  
}
```

```
void philosopher (i, n) {  
    while(1) {  
        if ((i+1) == n) {  
            sem_wait(fork[(i + 1) % n])  
            sem_wait(fork[i])  
        } else {  
            sem_wait(fork[i])  
            sem_wait(fork[(i + 1) % n])  
        }  
        eat & think  
        sem_signal(fork[i])  
        sem_signal(fork[(i + 1) % n])  
    }  
}
```