

# Ricerca Operativa LS

## Esercizi sulla simulazione numerica

### 1. Esercizio 1

#### Descrizione

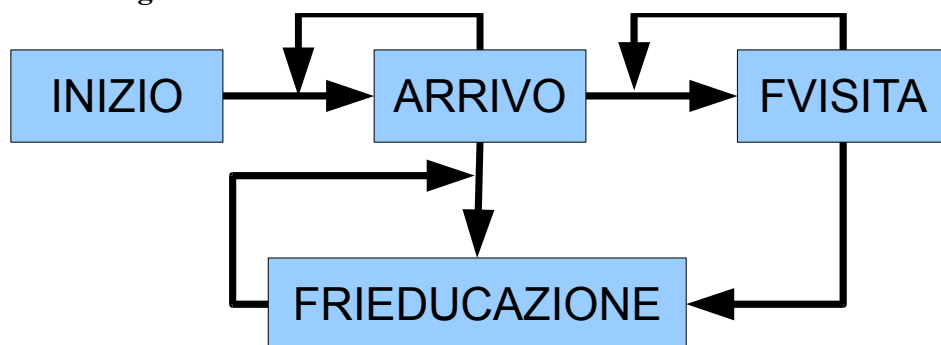
| ENTITÀ PERMANENTI        | ATTRIBUTI   |
|--------------------------|---|
| SISTEMA                  | TF, $\lambda$ , V, NA, TV1, TV2, NF, K, TR1, TR2, FLAGA, TINIZIO, NPE, FINE, TIC, NPU |
| FISIOTERAPISTA(1,...,NF) | FLAGF(I), I=1,...,NF  |

| ENTITÀ TEMPORANEE | ATTRIBUTI  |
|-------------------|------------|
| PAZIENTE          | TIC, FISIO |

| INSIEMI   | ORDINAMENTO | ENTITÀ MEMBRO | ENTITÀ PROPRIETARIO |
|-----------|-------------|---------------|---------------------|
| CODAFISIO | FIFO        | PAZIENTE      | SISTEMA             |
| CODAAMB   | FIFO        | PAZIENTE      | SISTEMA             |

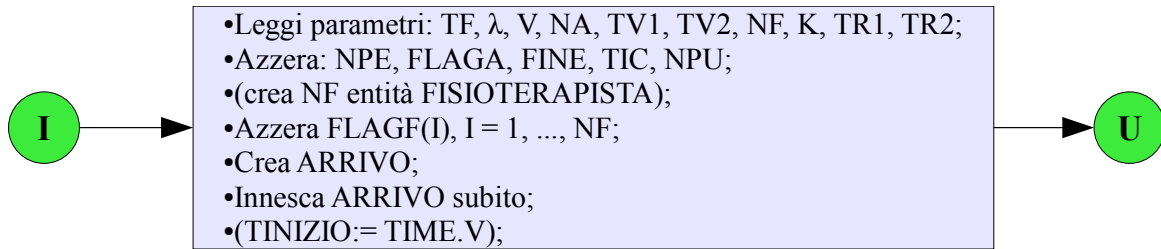
| EVENTO        | TIPO    | ARRTIBUTI |
|---------------|---------|-----------|
| INIZIO        | Esterno | -         |
| ARRIVO        | Interno | -         |
| FVISITA       | Interno | PAZ       |
| FRIEDUCAZIONE | Interno | PAZ       |

#### Diagramma degli inneschi

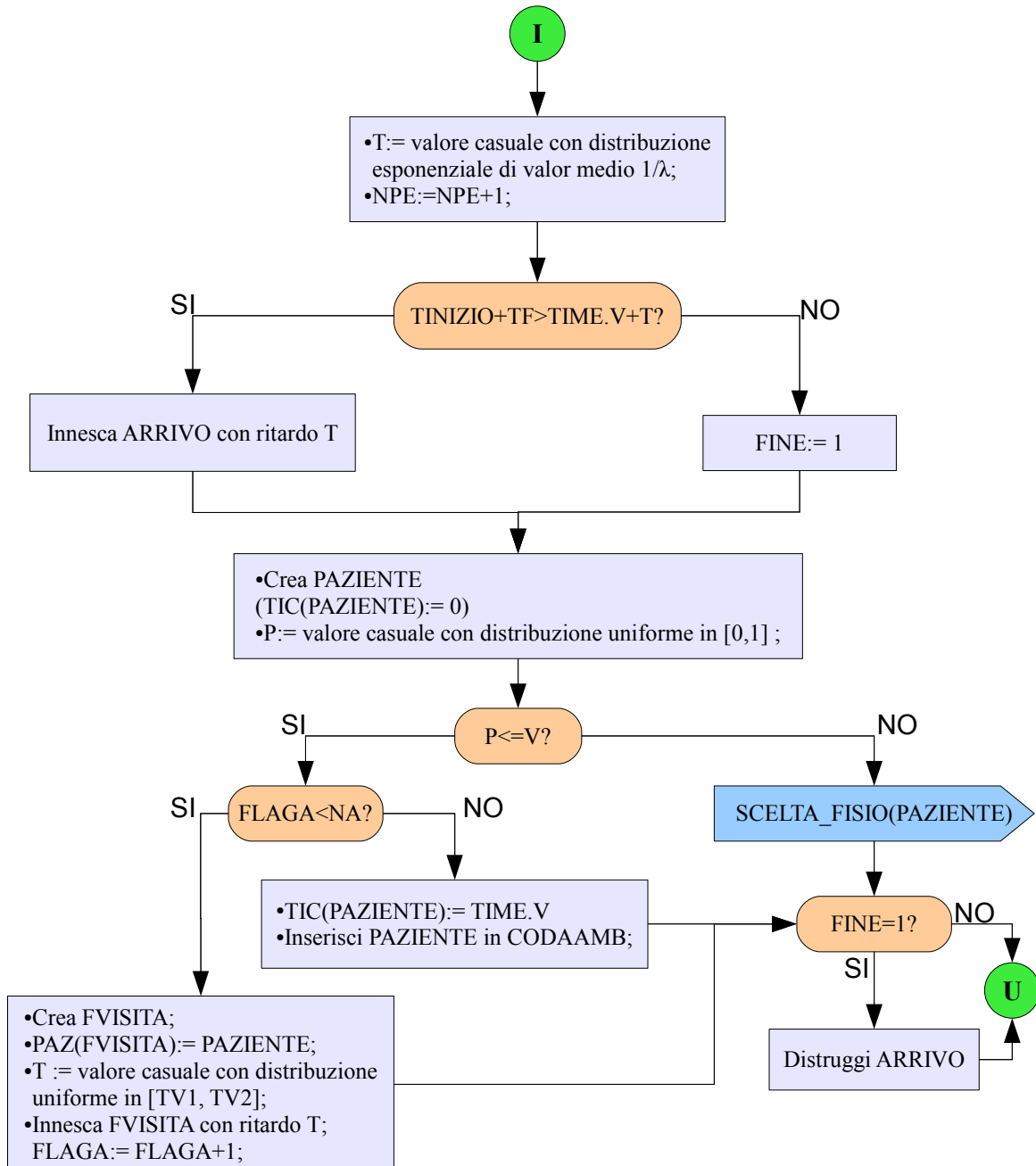


NOTA - vale la relazione: distribuzione di Poisson a valor medio  $\lambda \equiv$  distribuzione esponenziale a valore medio  $1/\lambda$ .

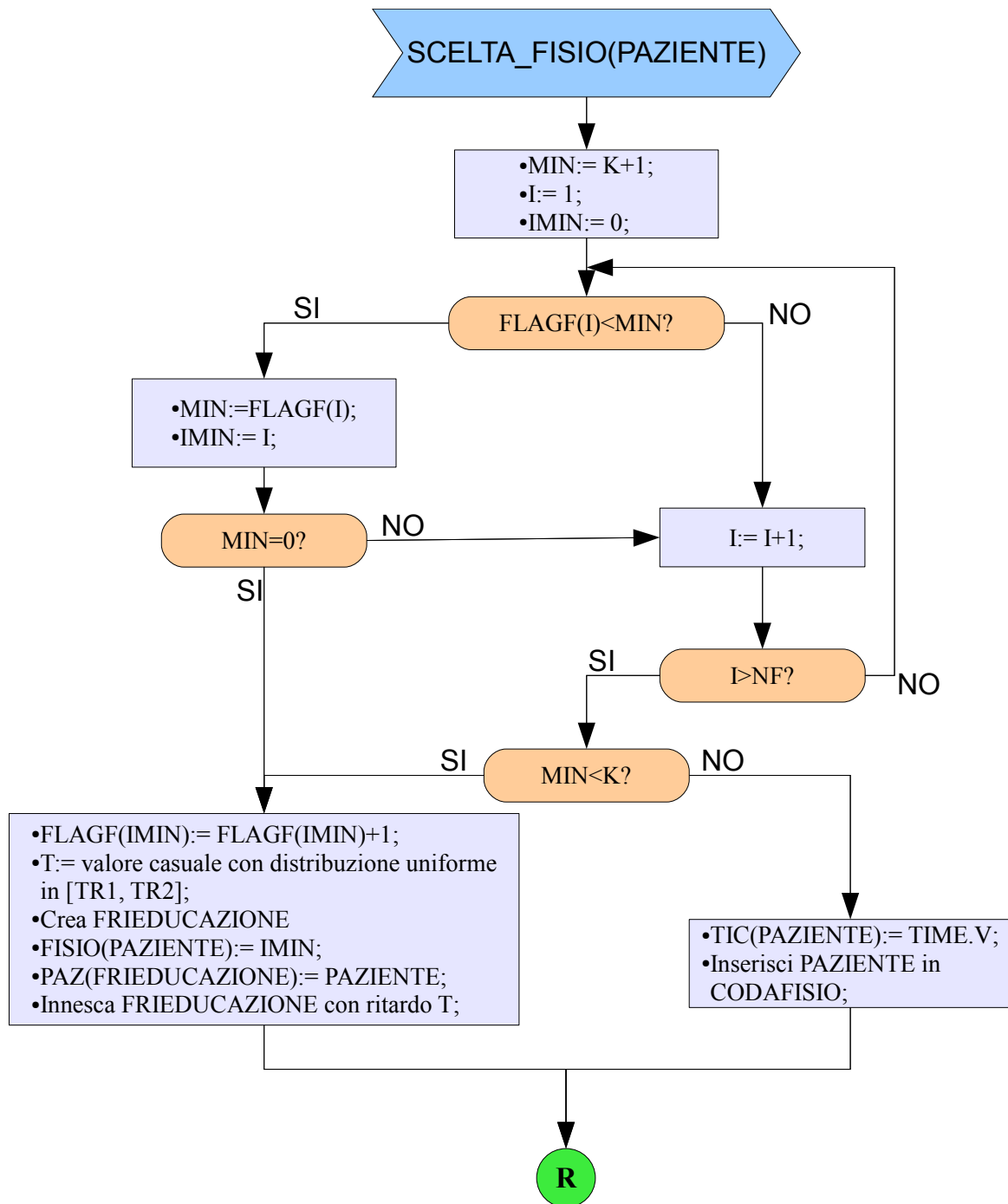
- evento **INIZIO**:



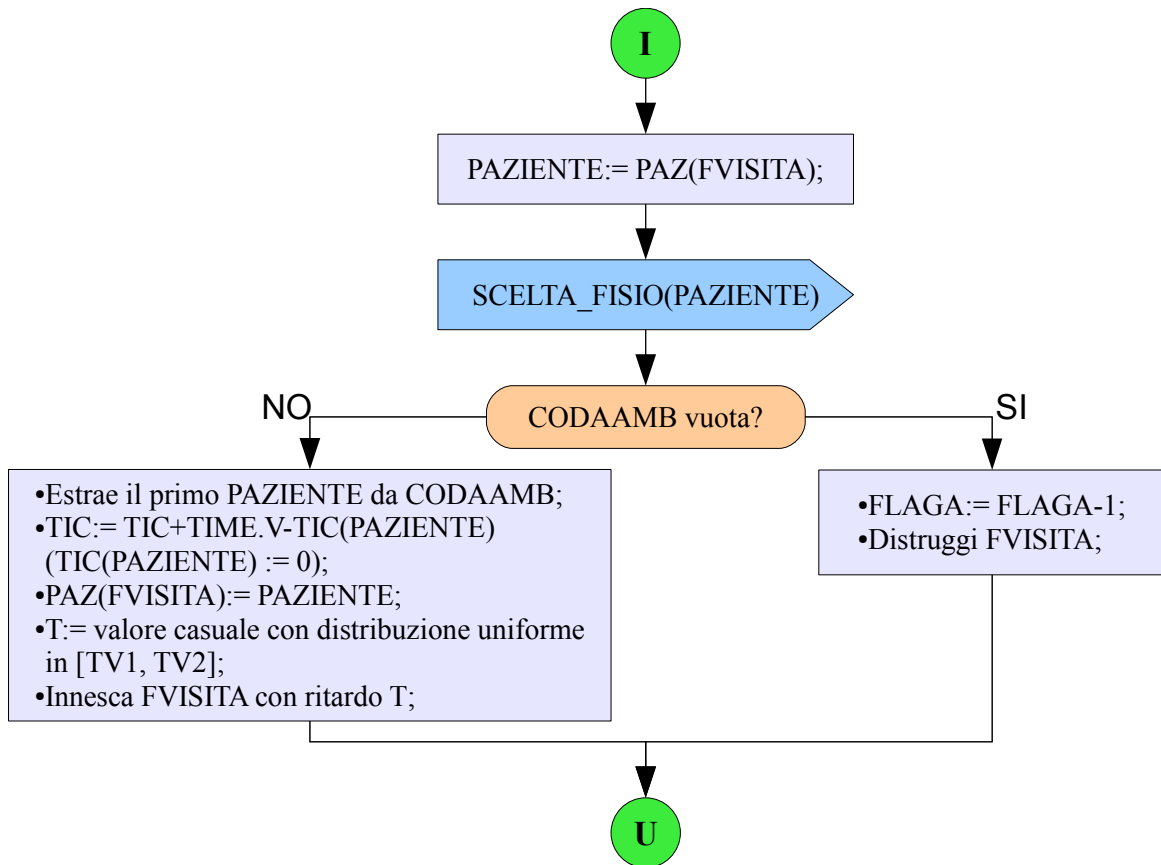
- evento **ARRIVO**:



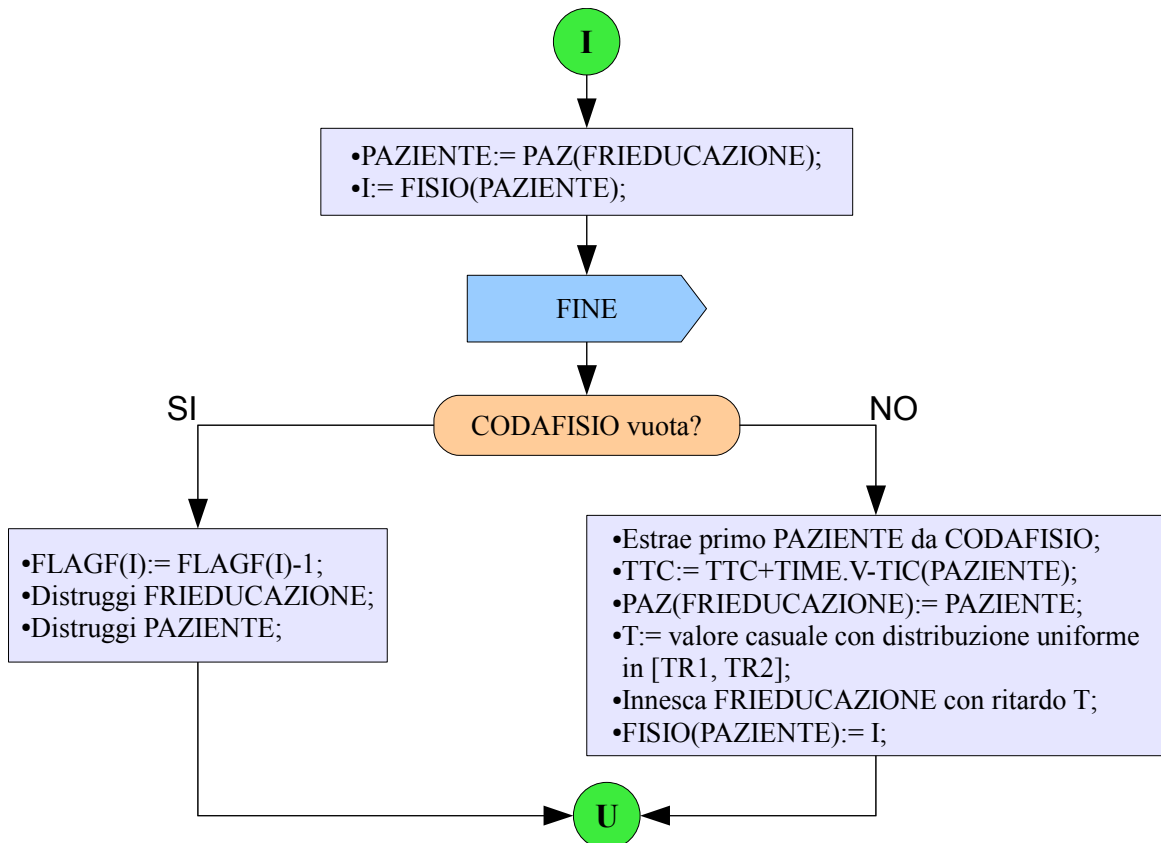
- sottoprogramma **SCELTA\_FISIO**:



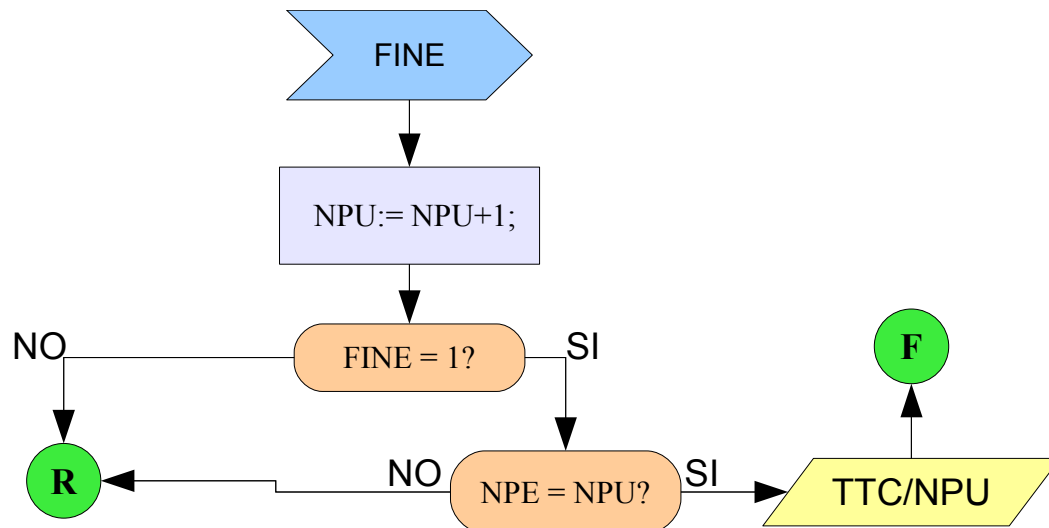
- evento **FVISITA**:



- evento **FRIEDUCAZIONE**:



- **FINE:**



## 2. Esercizio 2

### Descrizione

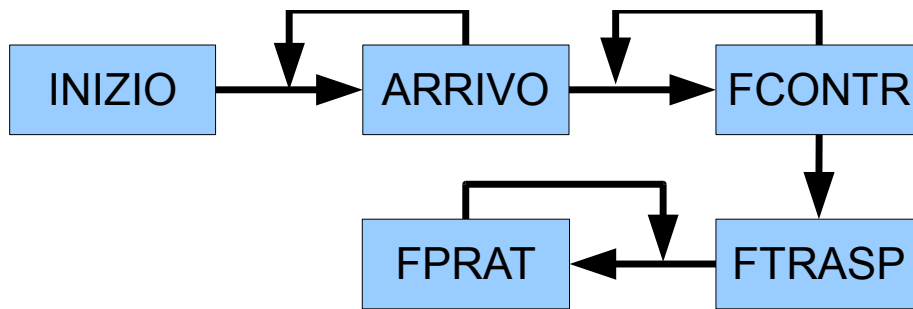
| ENTITÀ TEMPORANEE | ATTRIBUTI    |
|-------------------|--------------|
| UTENTE            | TIS, TIC, TC |

| ENTITÀ PERMANENTI | ATTRIBUTI   |
|-------------------|---|
| SISTEMA           | $\lambda$ , K, TC1, TC2, S, TR, H, TP1, TP2, R, NCOCC, NPOCC, NPERSI, NCOMPL, NUSC, TTC |

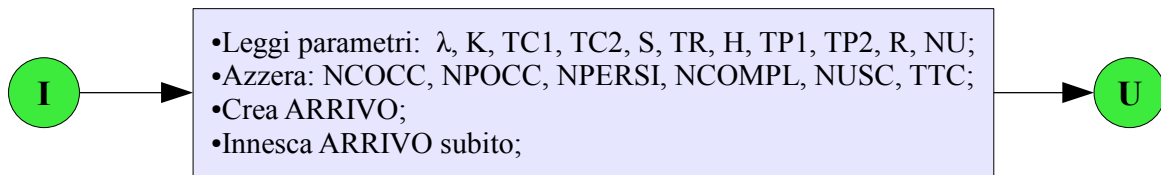
| INSIEMI | ORDINAMENTO       | ENTITÀ MEMBRO | ENTITÀ PROPRIETARIO |
|---------|-------------------|---------------|---------------------|
| CODAC   | FIFO              | UTENTE        | SISTEMA             |
| CODAP   | RANKED BY LOW TIS | UTENTE        | SISTEMA             |

| EVENTO | TIPO    | ARRTIBUTI |
|--------|---------|-----------|
| INIZIO | Esterno | -         |
| ARRIVO | Interno | -         |
| FCONTR | Interno | UT        |
| FTRASP | Interno | UT        |
| FPRAT  | Interno | UT        |

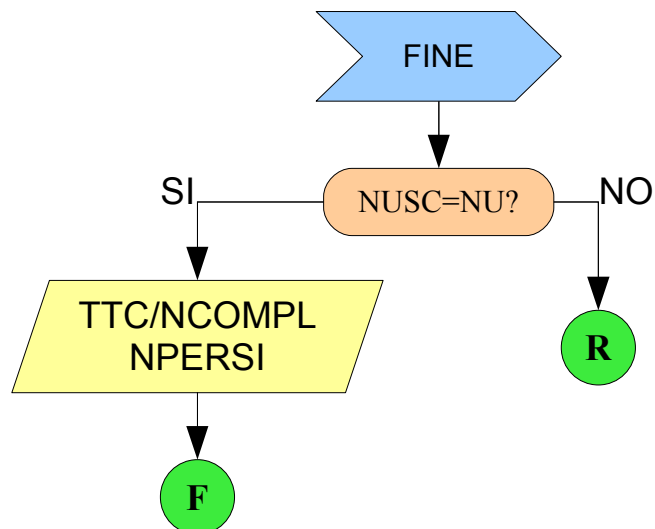
### Diagramma degli inneschi



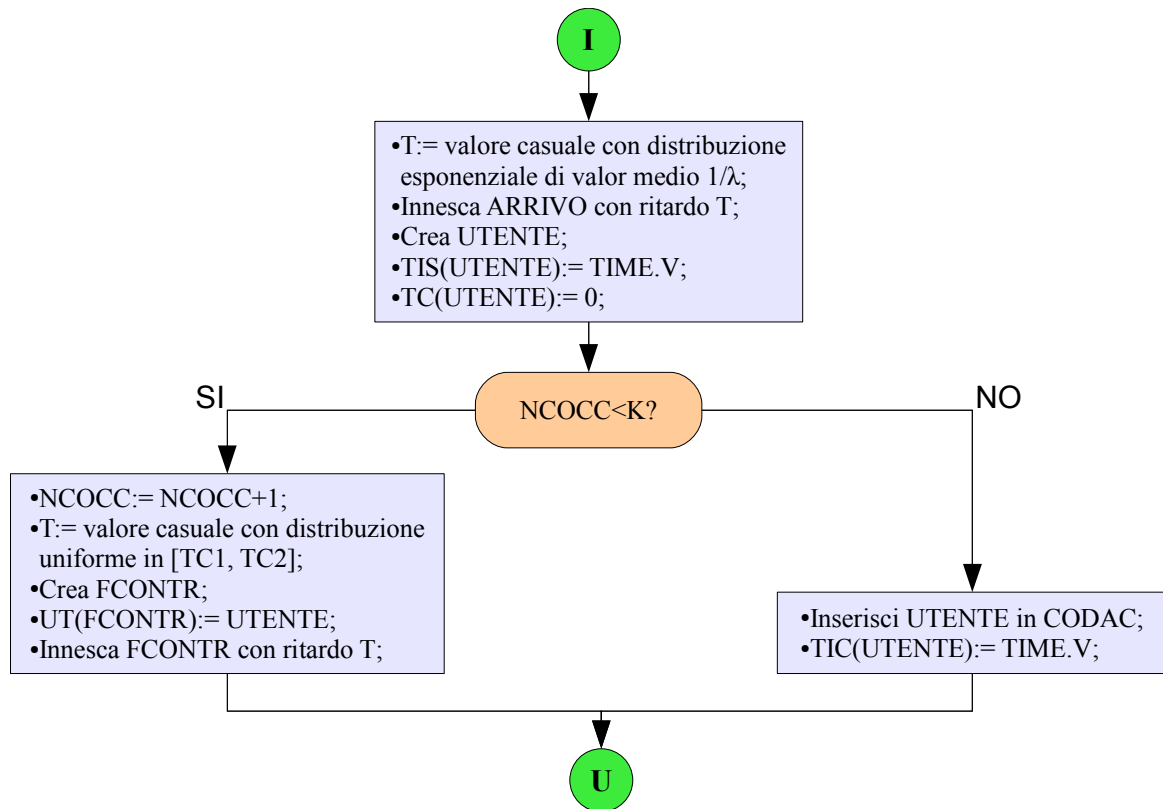
- evento **INIZIO**:



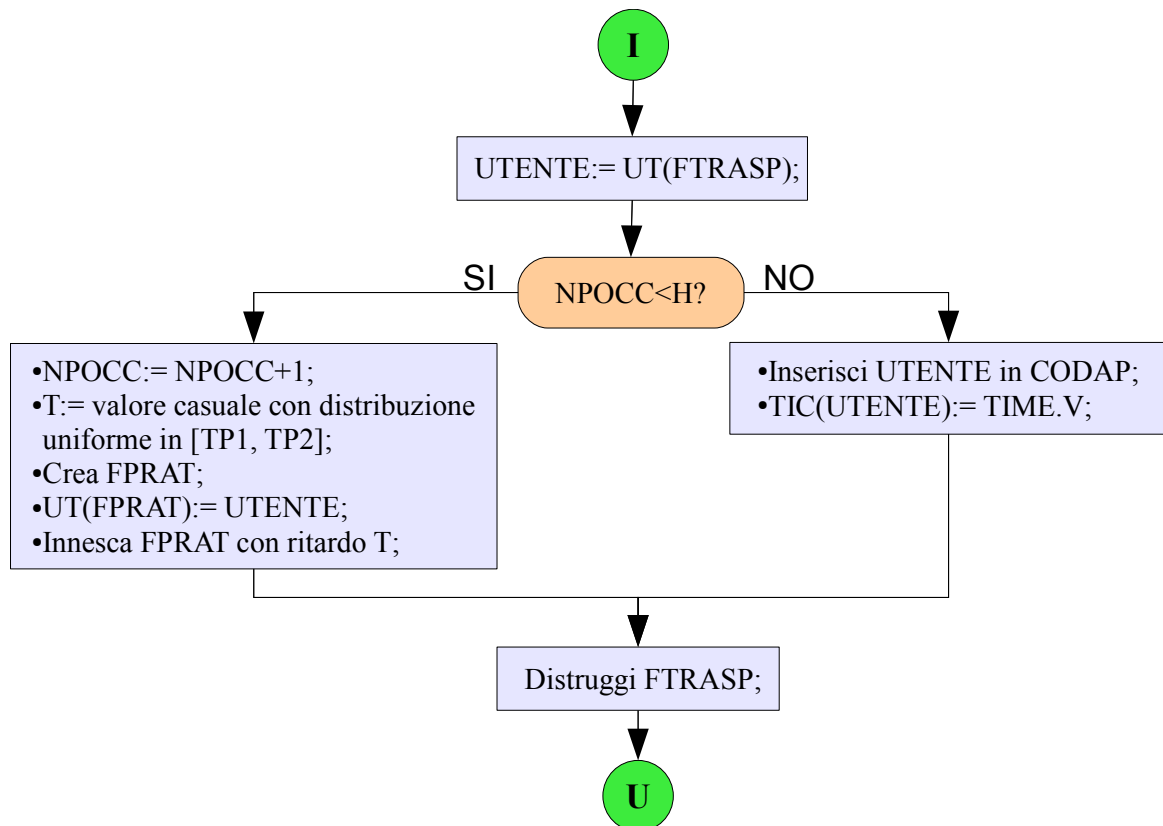
- FINE**:



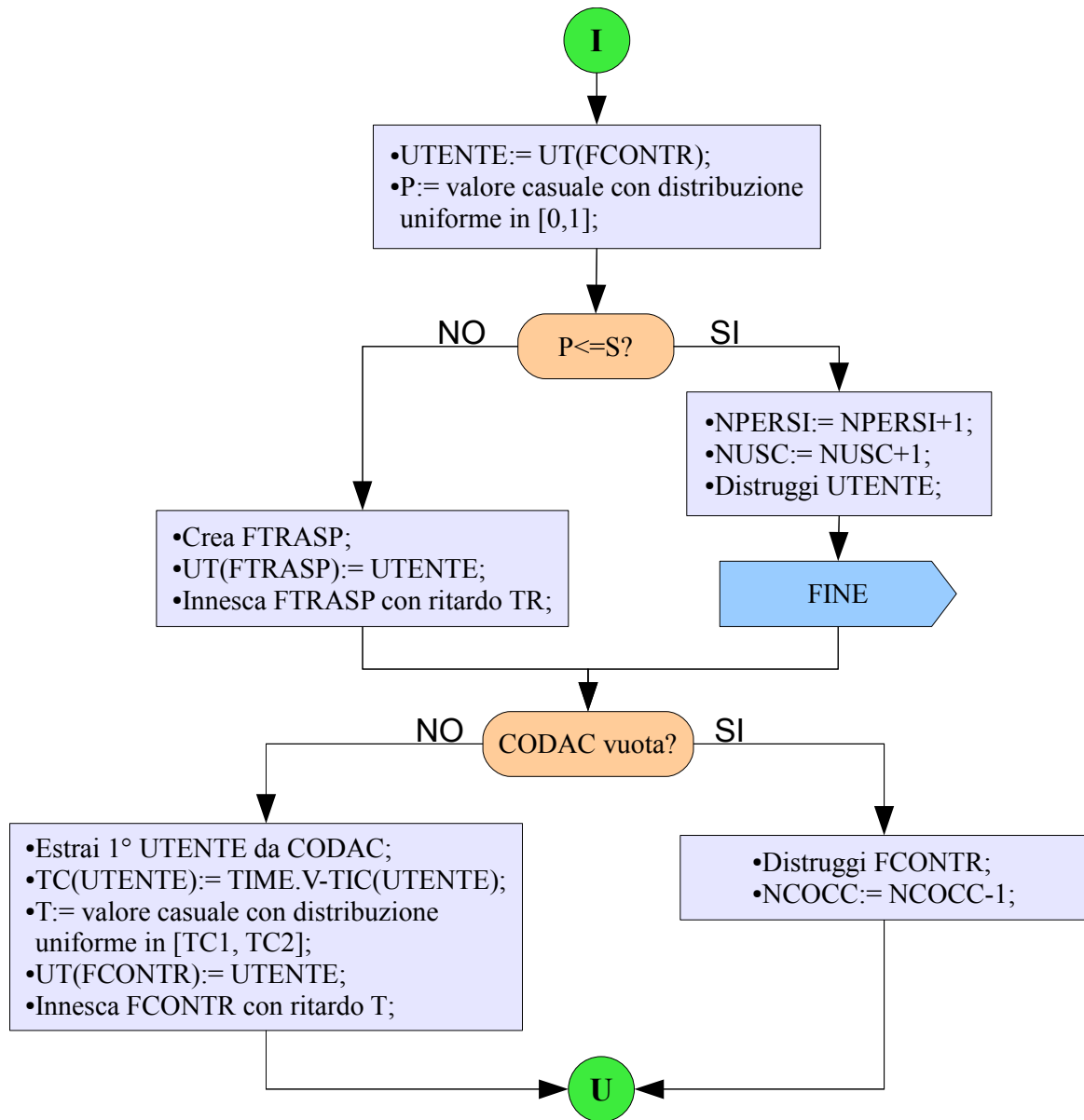
- evento **ARRIVO**:



- evento **FTRASP**:

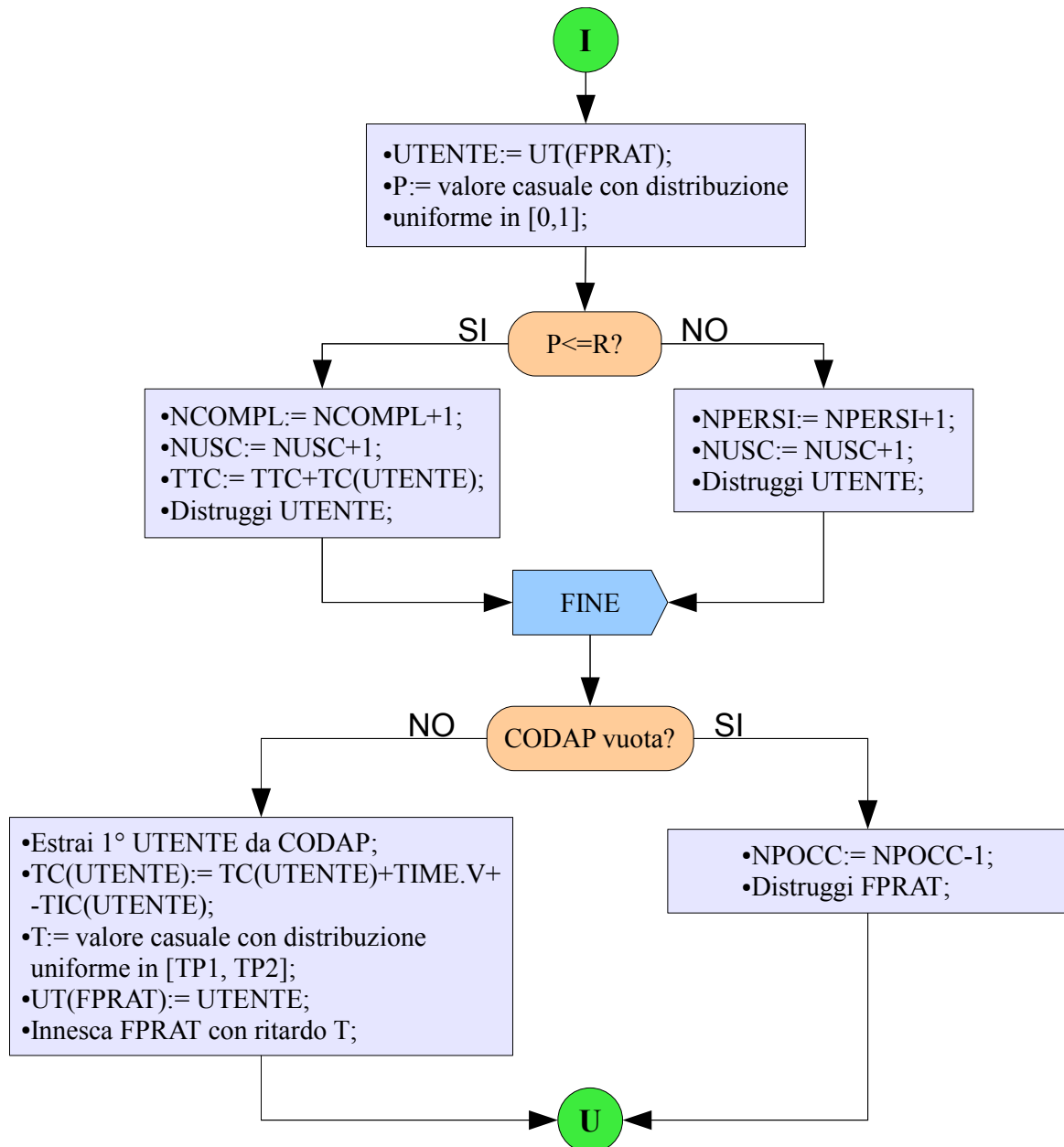


- evento **FCONTR**:





- evento **FPRAT**:



### 3. Esercizio 3

#### Descrizione

| ENTITÀ PERMANENTI    | ATTRIBUTI   |
|----------------------|---|
| SISTEMA              | TF, $\lambda$ , K, P1, P2, TATT, NMAX, NSERV, NPERSI, MAXC, TTC |
| REPARTO(I) I=1, 2, 3 | O(I), TMIN(I), TMAX(I), STATO(I), LCODA(I), NCONT(I), NDISP(I)  |

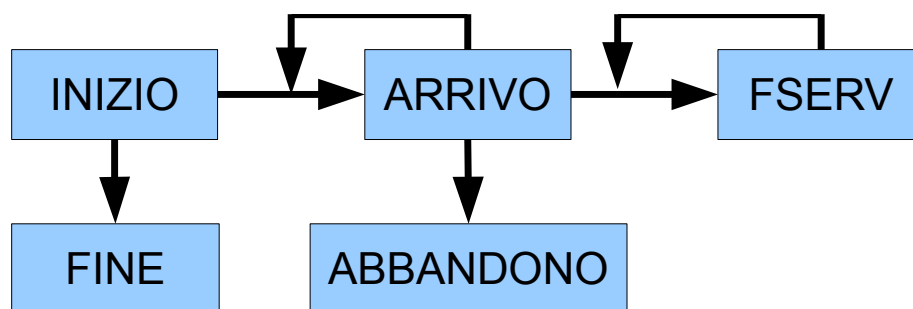
| ENTITÀ TEMPORANEE | ATTRIBUTI                       |
|-------------------|---------------------------------|
| CLIENTE           | TIC, TC, NC, REP, STATOABB, ABB |

**Nota:** l'attributo ABB è il riferimento all'evento ABBANDONO da disinnescare.

| INSIEMI            | ORDINAMENTO | ENTITÀ MEMBRO | ENTITÀ PROPRIETARIO |
|--------------------|-------------|---------------|---------------------|
| CODA(I)<br>I=1,2,3 | FIFO        | CLIENTE       | REPARTO(I)          |

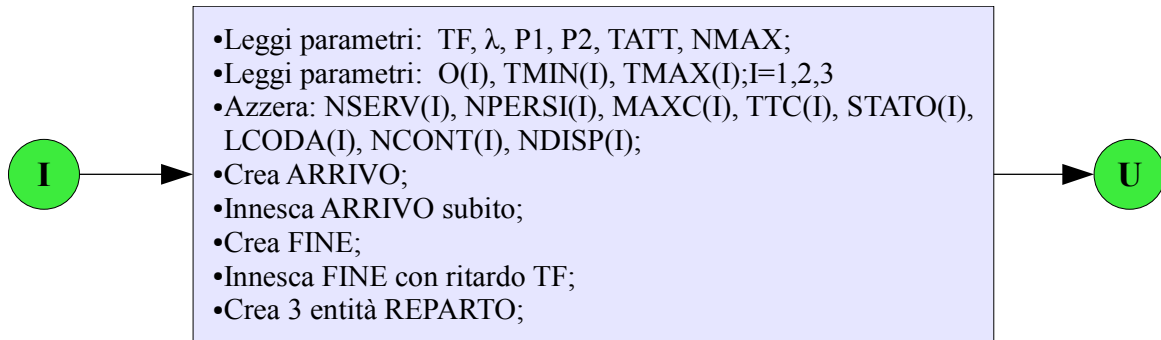
| EVENTO    | TIPO    | ARRTIBUTI |
|-----------|---------|-----------|
| INIZIO    | Esterno | -         |
| ARRIVO    | Interno | -         |
| FINE      | Interno | -         |
| ABBANDONO | Interno | CL        |
| FSERV     | Interno | CL        |

#### Diagramma degli inneschi

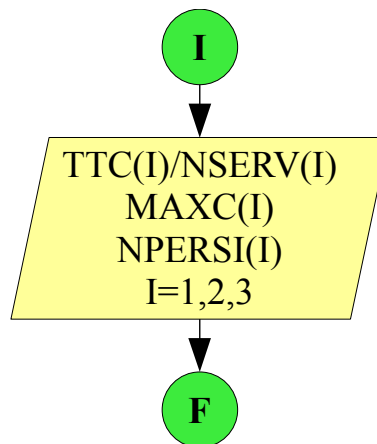


**Nota:** l'evento fine va innescato dall'evento inizio con ritardo TF.

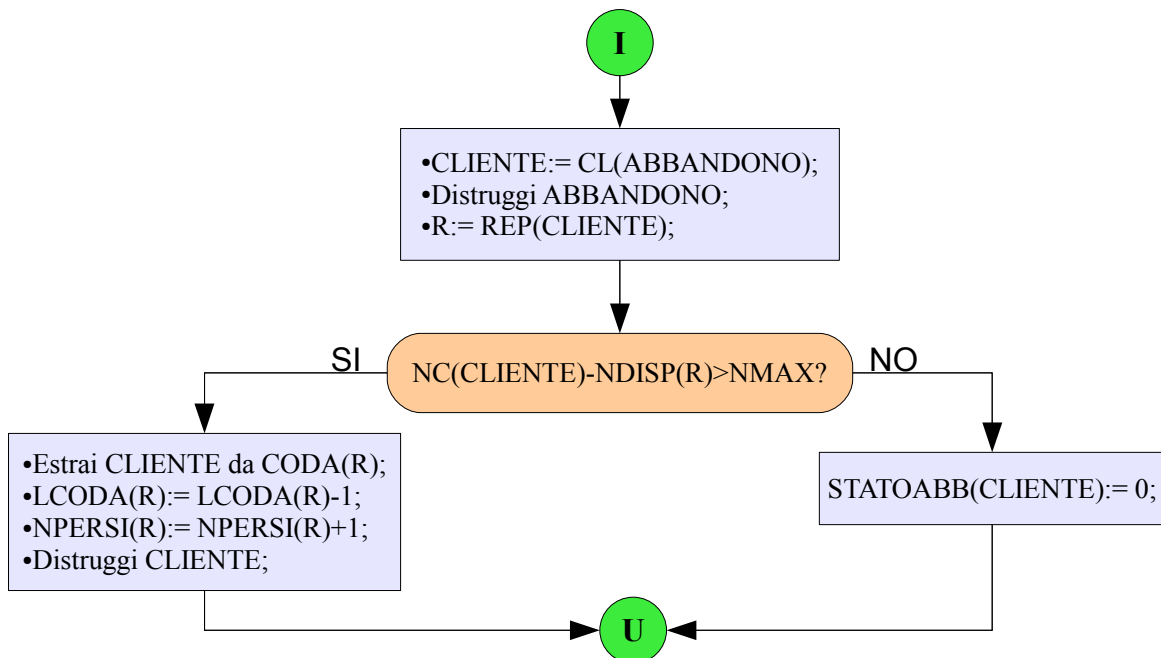
- evento **INIZIO**:



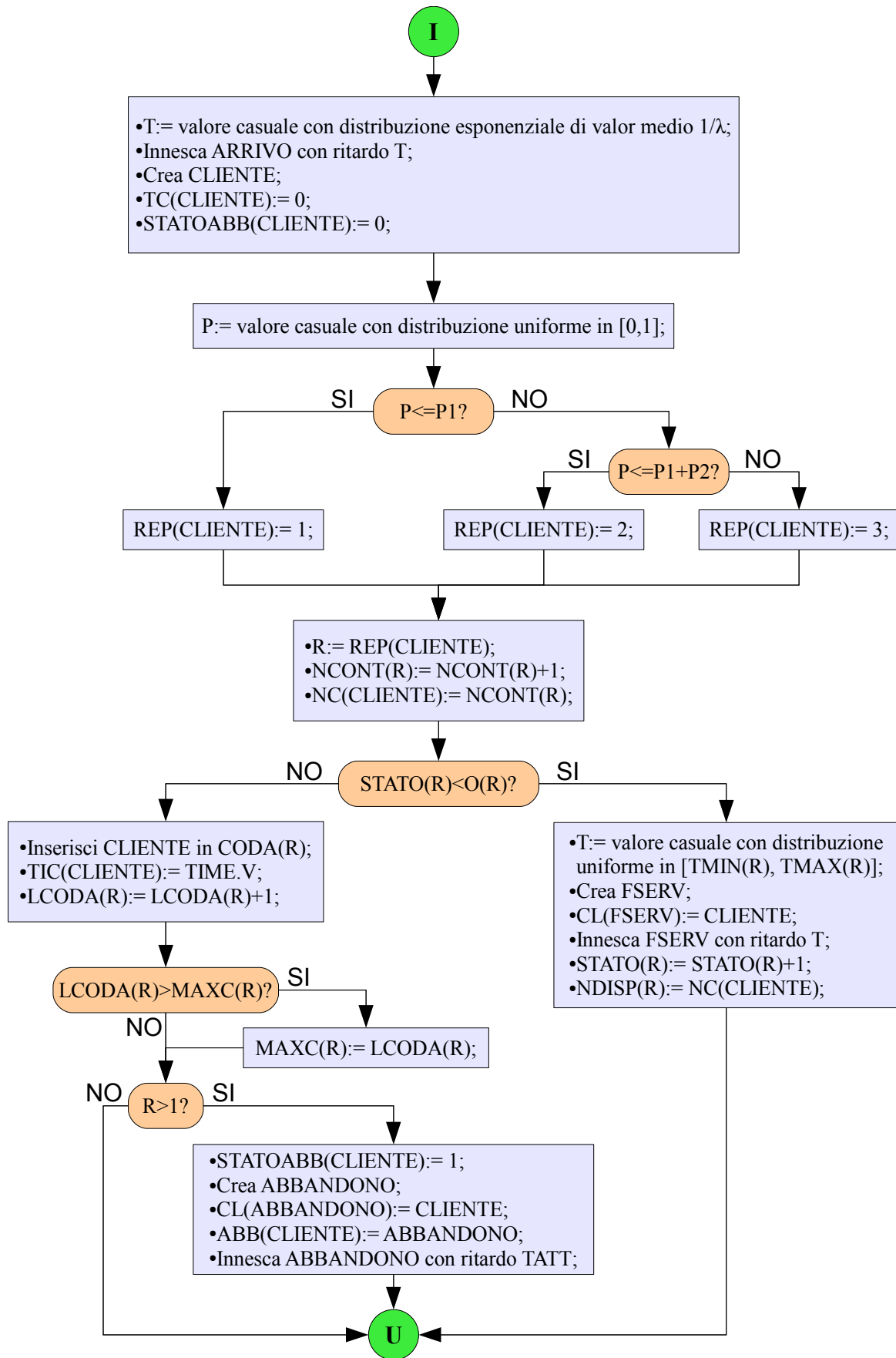
- evento **FINE**:



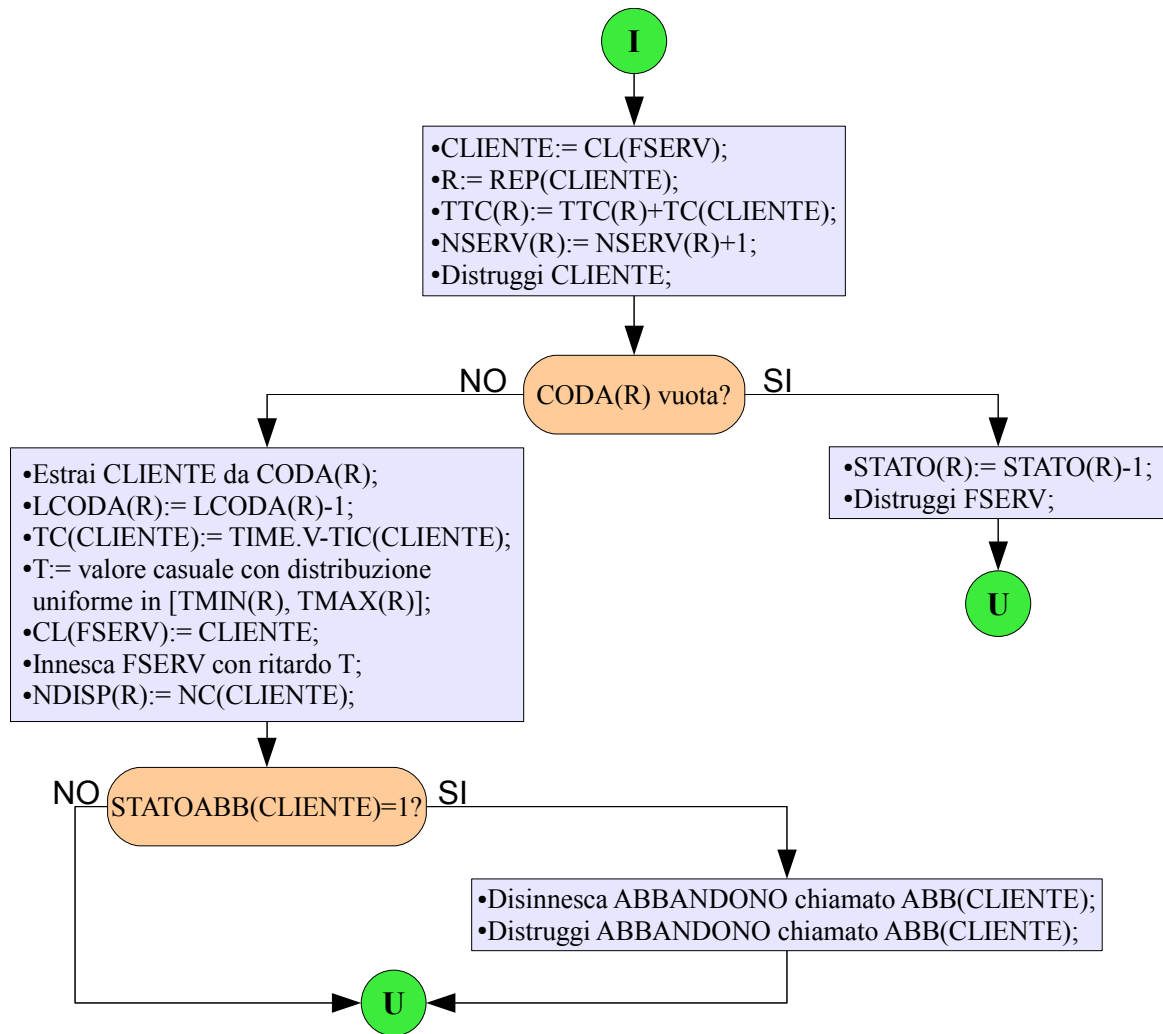
- evento **ABBANDONO**:



- evento **ARRIVO**:



- evento **FSERV**:



#### 4. Esercizio 4 (esercizi ottimizzazione)

##### Descrizione

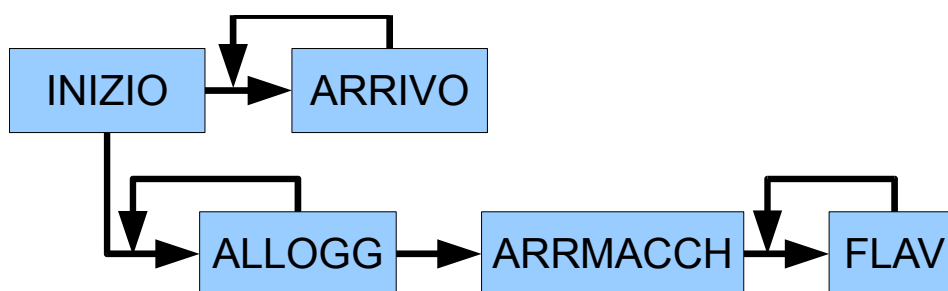
| ENTITÀ PERMANENTI       | ATTRIBUTI  |
|-------------------------|--|
| SISTEMA                 | K, R, $\lambda$ , T, L1, L2, N, NS, TCTOT, TSTOT |
| MACCHINA(I) I=1, ..., K | OCCUP(I)   |

| ENTITÀ TEMPORANEE | ATTRIBUTI            |
|-------------------|----------------------|
| PEZZO             | TIC, TTC, TIS, MACCH |

| INSIEMI               | ORDINAMENTO | ENTITÀ MEMBRO | ENTITÀ PROPRIETARIO |
|-----------------------|-------------|---------------|---------------------|
| CODAM(I)<br>I=1,...,K | FIFO        | PEZZO         | MACCHINA(I)         |
| CODANAS               | FIFO        | PEZZO         | SISTEMA             |

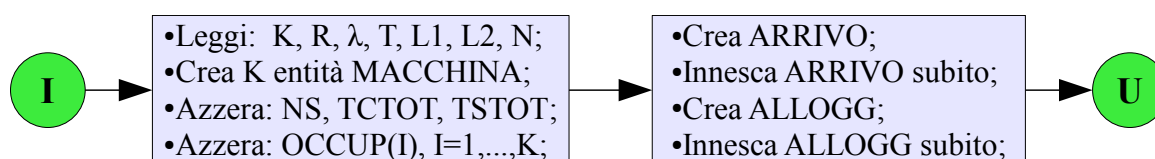
| EVENTO   | TIPO    | ARRTIBUTI |
|----------|---------|-----------|
| INIZIO   | Esterno | -         |
| ARRIVO   | Interno | -         |
| ALLOGG   | Interno | -         |
| ARRMACCH | Interno | PEZ       |
| FLAV     | Interno | PEZ       |

##### Diagramma degli inneschi

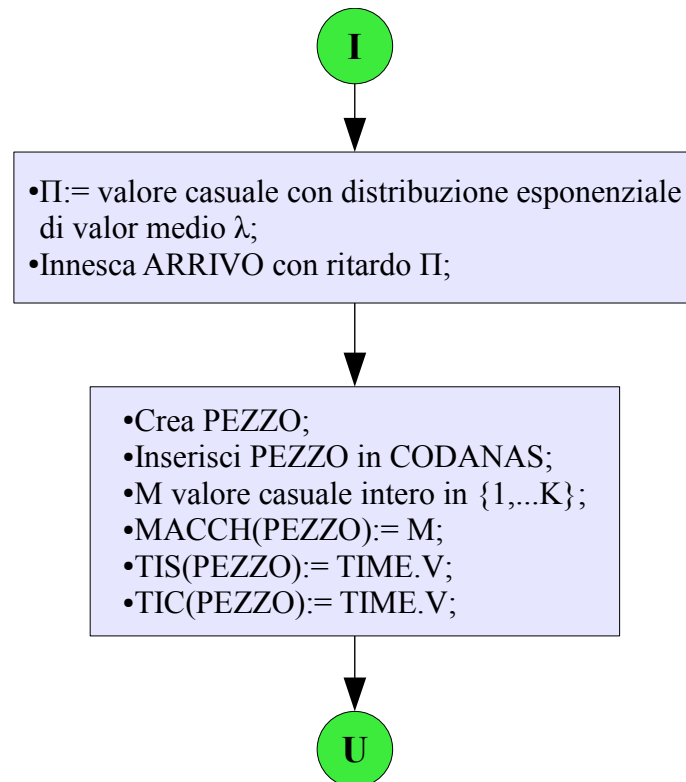


**Nota:** è necessario definire una priorità tra gli eventi – **priority order:** ARRIVO, ALLOGG.

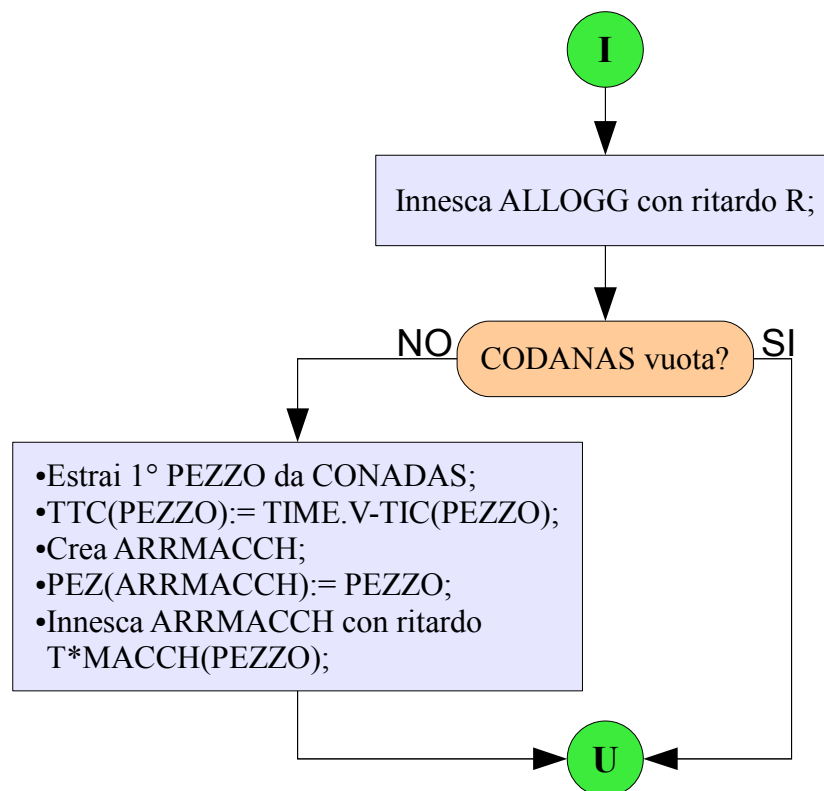
- evento **INIZIO**:



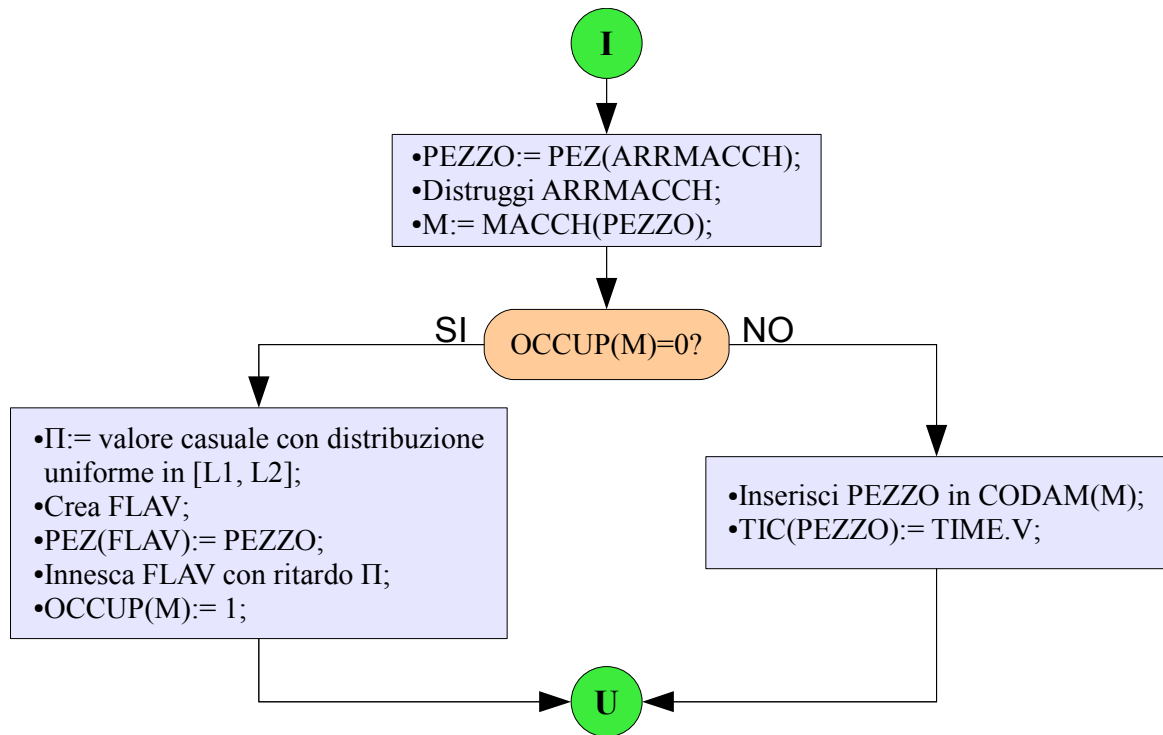
- evento **ARRIVO**:



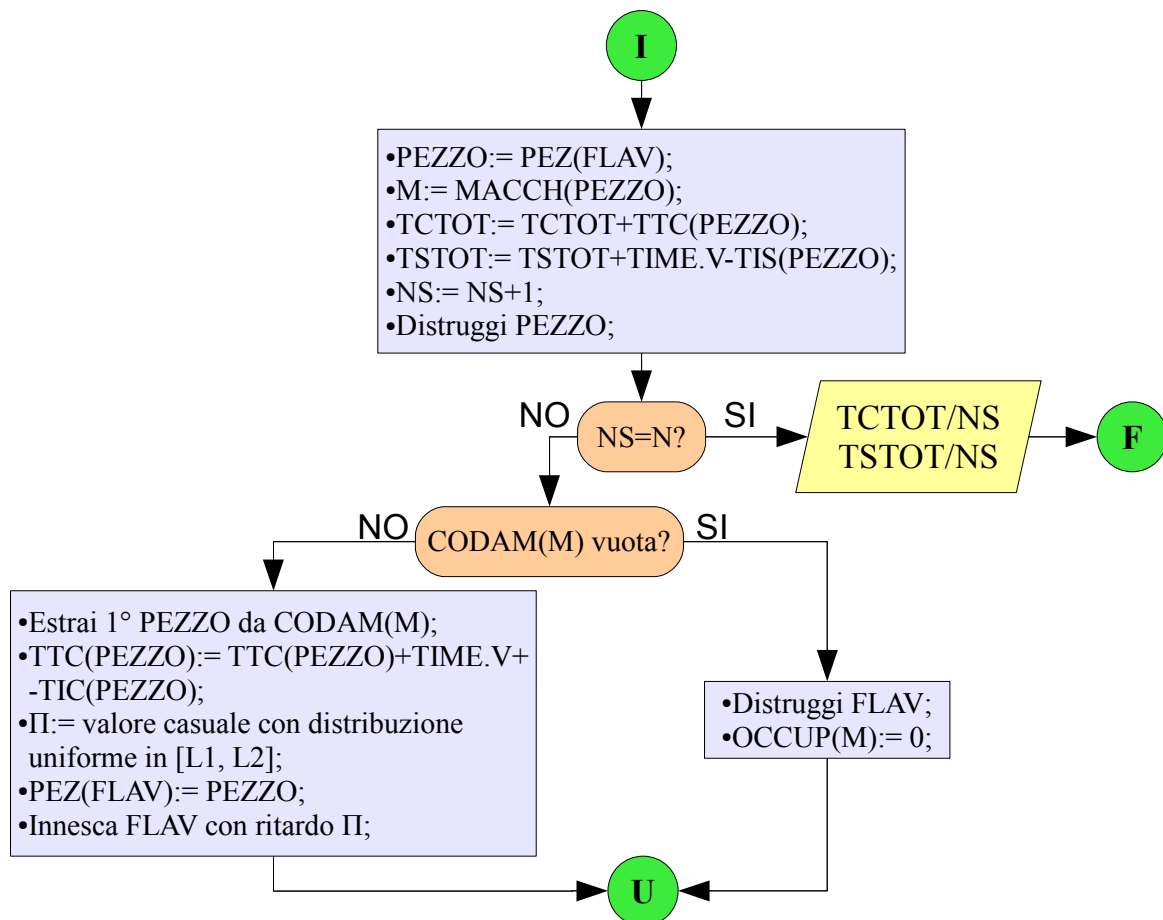
- evento **ALLOGG**:



- evento **ARRMACCH**:



- evento **FLAV**:





## 5. Esercizio VI.4

### Descrizione

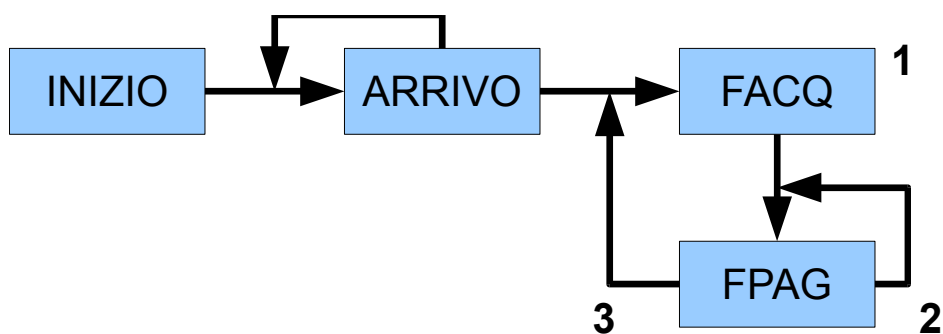
| ENTITÀ PERMANENTI     | ATTRIBUTI  |
|-----------------------|--|
| SISTEMA               | $\lambda$ , NC, NCS, DMIA, DMAA, DMIP, DMAP, NMAX, NCRO, NA, TTS, NS |
| CASSA(I), I=1,...,NCS | NCCS(I), FCSO(I)   |

| ENTITÀ TEMPORANEE | ATTRIBUTI |
|-------------------|-----------|
| CLIENTE           | AC, TIS   |

| INSIEMI                | ORDINAMENTO | ENTITÀ MEMBRO | ENTITÀ PROPRIETARIO |
|------------------------|-------------|---------------|---------------------|
| CCAS(I)<br>I=1,...,NCS | FIFO        | CLIENTE       | CASSA(I)            |
| CCAR                   | FIFO        | CLIENTE       | SISTEMA             |

| EVENTO | TIPO    | ARRTIBUTI |
|--------|---------|-----------|
| INIZIO | Esterno | -         |
| ARRIVO | Interno | -         |
| FACQ   | Interno | CL        |
| FPAG   | Interno | CL, CAS   |

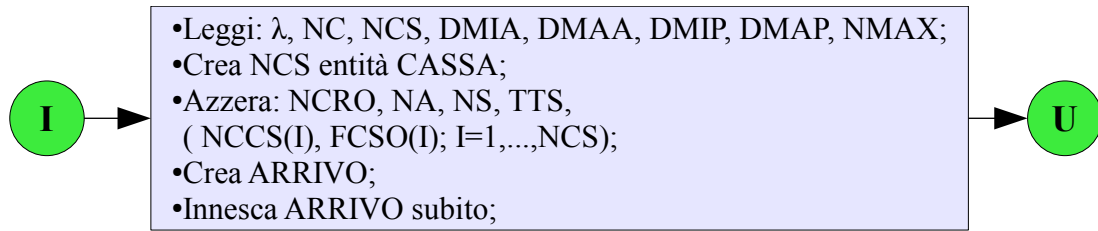
### Diagramma degli inneschi



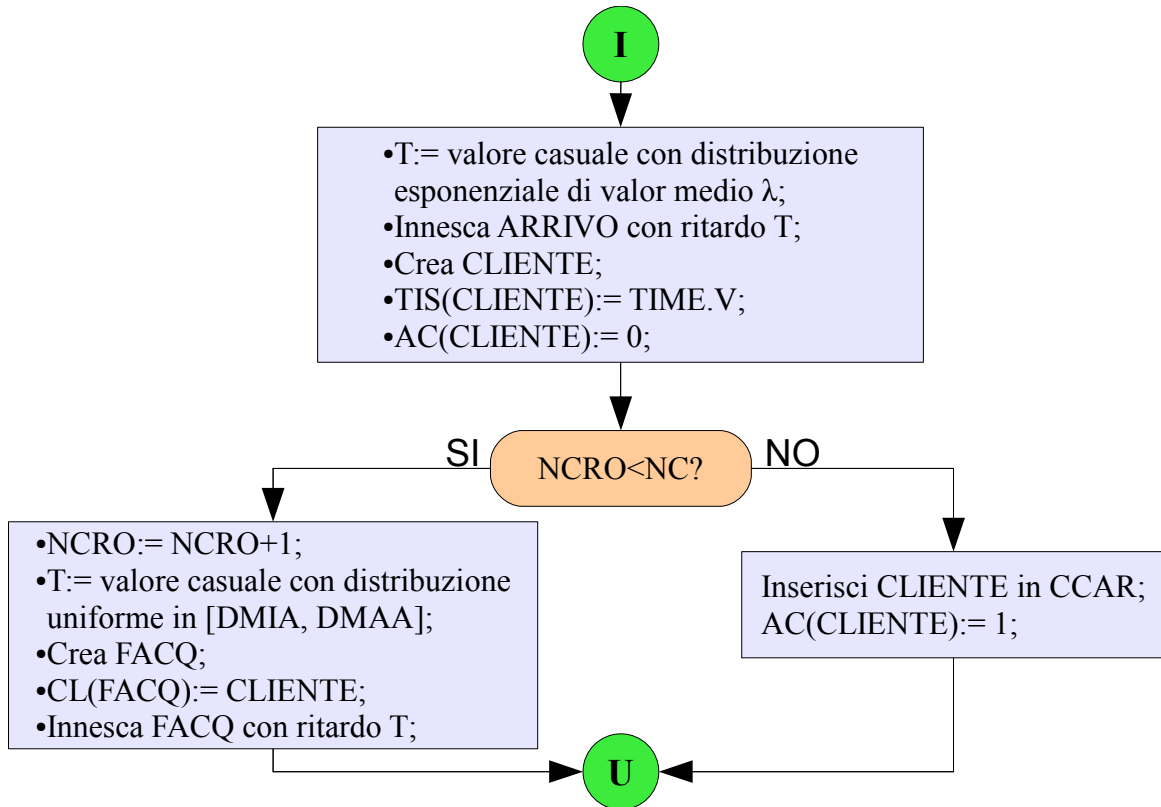
### Note:

1. Non rilascia la risorsa CARRELLO perché deve ancora pagare;
2. Rilascia la risorsa CASSA ed innesca un altro evento FPAG;
3. Rilascia la risorsa CARRELLO ed innesca un altro evento FACQ;

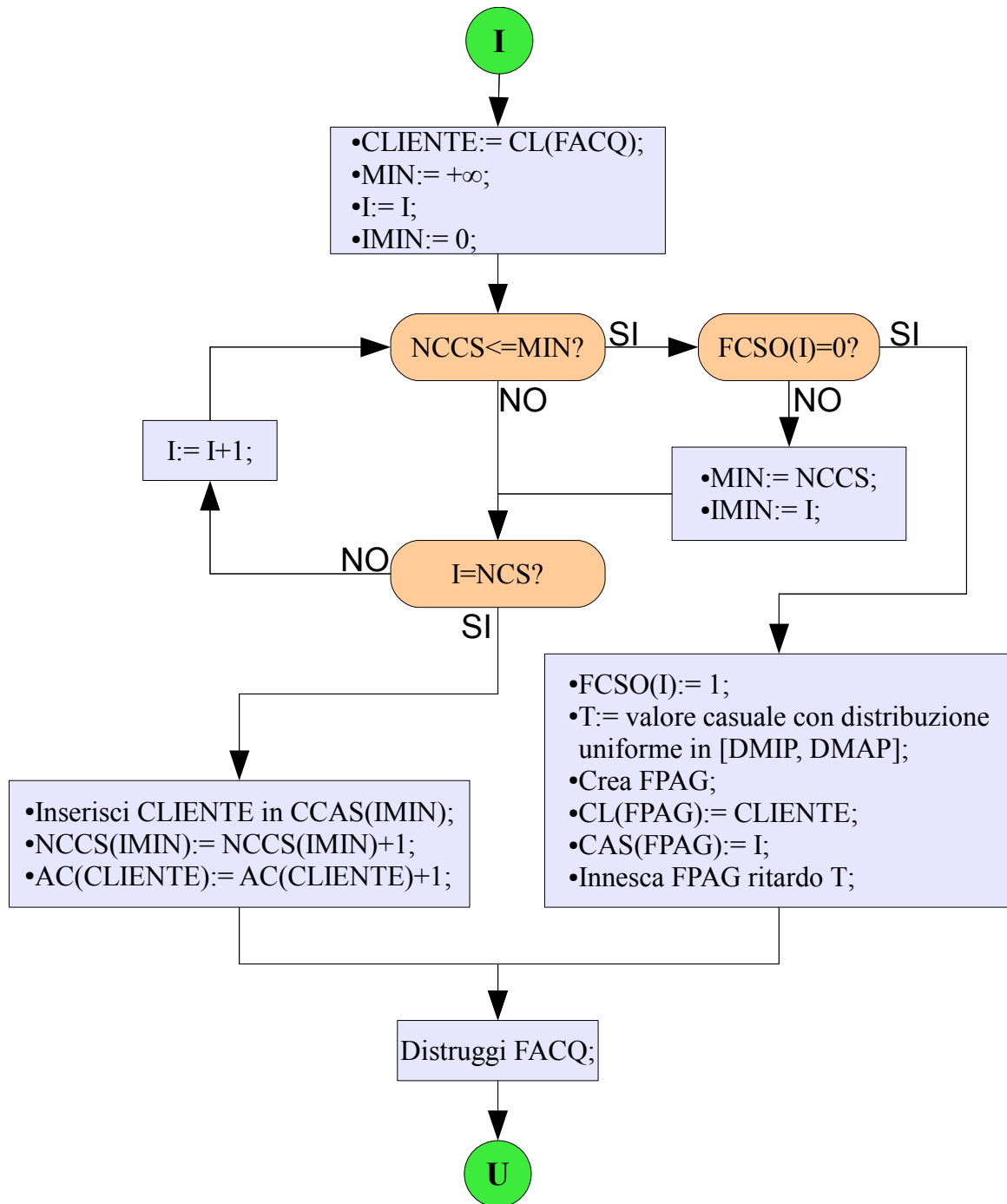
- evento **INIZIO**:



- evento **ARRIVO**:



- evento **FACQ**:



- evento **FPAG**:

