Chapter 5:
Additional Test-Mode Capabilities
Chapter 5

Additional Test-Mode Capabilities

- The "Picking Up" and "Dropping" of Xacts
- The `trap next` Command
- The `trap system` Command
- The `trap next system` Command
- Displaying Trap Conditions
- The `trap clock=clock_time` Command
Review of the Scan Phase Logic in Simplified Form
(Figure 4.9)

Scan Phase

(1) If a scan trap is set, give control to the interactive user

(2) Is there an Xact at the front of the CEC?
   No
   (3) Move this Transaction as far along its path as possible
      Yes

(4) Nonzero ADVANCE => put this Xact on the FEC TERMINATE => destroy this Xact

(5) Is the model's Termination Counter ≤ 0 ?
   Yes
   Simulation Report
   No

(6) Is there a sequential Transaction on the CEC?
   Yes
   No

Clock Update Phase

CEC

5-1
Simplified Scan-Phase Logic Modified to Show the Points at which next and system interrupts occur
(a modified form of Figure 4.9)

Scan Phase

If a scan trap is set, give control to the user

Is there an Xact at the front of the CEC?

Yes

"Pick up" the Xact

Move this Transaction as far along its path as possible

Nonzero ADVANCE ⇒ put this Xact on the FEC TERMINATE ⇒ destroy this Xact

"Drop" the Xact

Is the model's Termination Counter ≤ 0 ?

Yes Simulate Report

No

Is there a sequential Transaction on the CEC?

Yes

No

Clock Update Phase
The
trap next
trap system
and
trap next system
Test-Mode Commands

trap next
run

trap system
run

trap next system
run
Fundamental Scan-Phase Logic Modified to Show the Points at which next and system interrupts occur

(Figure 5.1)

Scan Phase

If a scan trap is set, give control to the user

Is there an Xact at the front of the CEC?

No

Yes

(A)

If a next trap is set, give control to the user

Move this Transaction as far along its path as possible

Nonzero ADVANCE => put this Xact on the FEG TERMINATE => destroy this Xact

(B)

If a system trap is set, give control to the interactive user

Is the model's Termination Counter ≤ 0 ?

Yes Simulation Report

No

Yes (6)

Is there a sequential Transaction on the CEC?

No

Clock Update Phase
Moving Through a Simulation When \textit{next} and \textit{system} Traps Are Set

(Figure 5.2)

1. Start

2. The user issues a command to resume the simulation ("run")

3. GPSS/H proceeds until it picks up the next Transaction, then issues a "poised at" message and gives control to the user

4. The user decides whether to resume the simulation, or quit

5. The user issues a command to resume the simulation ("run")

6. GPSS/H moves the Xact (picked up at Box 3) until it is dropped, then issues a "why dropped" message and gives control to the user

7. The user decides whether to resume the simulation, or quit

8. The user issues a command to quit quickly ("qq")

Stop
A Model File to Demonstrate *next and system* traps
(Figure 5.3)

```
SIMULATE
*
BLOCK1  GENERATE  40,15
BLOCK2  ADVANCE   25,10
BLOCK3  TERMINATE 1
*
BLOCK4  GENERATE  30,20
BLOCK5  ADVANCE   20,5
BLOCK6  TERMINATE 1
*
START   5
END
```
## Figure 5.4, Screen 1
The First of Six Computer Screens Produced by Running the Figure 5.3 Model File in Test Mode

<table>
<thead>
<tr>
<th>BLOCK CURRENT</th>
<th>TOTAL</th>
<th>fig53.gps SOURCE CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0</td>
<td>BLOCK2 ADVANCE 25,10</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>BLOCK3 TERMINATE 1</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>BLOCK4 GENERATE 30,20</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>BLOCK5 ADVANCE 20,5</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>BLOCK6 TERMINATE 1</td>
</tr>
</tbody>
</table>


XACT: 2 CURBLK: BIRTH NEXTBLOCK: BLOCK4 CHAINS: CEC PC:
MARK-TIME: MOVE-TIME: ------- PRIORITY: 0

WOLVERINE SOFTWARE CORPORATION
4115 ANNANDALE ROAD
ANNANDALE, VIRGINIA 22003, USA

Ready!

: trap next system Dialog After "Ready!" Prompt
: run
XACT 2 POISED AT BLOCK 4 (BLOCK4). RELATIVE CLOCK: 29.9742
### Figure 5.3, Screen 2

<table>
<thead>
<tr>
<th>BLOCK</th>
<th>CURRENT</th>
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<th>fig53.gps</th>
<th>SOURCE</th>
<th>CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
<td></td>
<td>BLOCK3</td>
<td>TERMINATE</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td></td>
<td>BLOCK4</td>
<td>GENERATE</td>
<td>30,20</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>1</td>
<td>BLOCK5</td>
<td>ADVANCE</td>
<td>20,5</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>0</td>
<td>BLOCK6</td>
<td>TERMINATE</td>
<td>1</td>
</tr>
</tbody>
</table>

---


<table>
<thead>
<tr>
<th>XACT:</th>
<th>CURBLK:</th>
<th>NEXTBLK:</th>
<th>CHAINS:</th>
<th>PC:</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>BLOCK5</td>
<td>BLOCK6</td>
<td>FEC</td>
<td></td>
</tr>
</tbody>
</table>

MARK-TIME: 29.9742  MOVE-TIME: 47.0151  PRIORITY: 0

---

Ready!
: trap next system
: run

XACT 2 POISED AT BLOCK 4 (BLOCK4). RELATIVE CLOCK: 29.9742

: run

XACT 2 PLACED ON FEC AT BLOCK 5 (BLOCK5). RELATIVE CLOCK: 29.9742

: 
An Expanded View of Box 3 ("Xact Movement") in Fig. 2.19
(Figure 4.5)

```
from
Box 2

"START"

Simulated Time: 0.0
Initialize the model's TC;
Initialize the model's
GENERATE Blocks

(3) ("Transaction Movement")

Scan Phase
(update the model at the
current simulated time)

TC>0

Clock Update Phase
(advance to the next
simulated time)

TC<0

Go on to produce the
Postsimulation Report

to
Box 4
```
Figure 5.3, Screen 3

<table>
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<th>BLOCK CURRENT</th>
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<tbody>
<tr>
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<td>0</td>
<td>BLOCK1 GENERATE 40,15</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>BLOCK2 ADVANCE 25,10</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>BLOCK3 TERMINATE 1</td>
</tr>
</tbody>
</table>

S/C: OFF
ABS CLOCK: 33.1089
REL CLOCK: 33.1089
TTG: 5

XACT: 1
CURBLK: BIRTH
NEXTBLK: BLOCK1
CHAINS: CEC
PC:
MARK-TIME: 0.
MOVE-TIME: -----
PRIORITY: 0

: run

XACT 2 POISED AT BLOCK 4 (BLOCK4). RELATIVE CLOCK: 29.9742
: run

XACT 2 PLACED ON FEC AT BLOCK 5 (BLOCK5). RELATIVE CLOCK: 29.9742

: run

XACT 1 POISED AT BLOCK 1 (BLOCK1). RELATIVE CLOCK: 33.1089

Fresh Dialog
<table>
<thead>
<tr>
<th>BLOCK CURRENT</th>
<th>TOTAL</th>
<th>fig53.gps</th>
<th>SOURCE CODE</th>
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<td>BLOCK1</td>
<td>GENERATE 40,15</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>BLOCK2</td>
<td>ADVANCE 25,10</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>BLOCK3</td>
<td>TERMINATE 1</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>BLOCK4</td>
<td>GENERATE 30,20</td>
</tr>
</tbody>
</table>

S/C: OFF  ABS CLOCK: 33.1089  REL CLOCK: 33.1089  TTG: 5

XACT: 1  CURBLK: BLOCK2  NEXTBLK: BLOCK3  CHAINS: FEC  PC:

MARK-TIME: 33.1089  MOVE-TIME: 63.4776  PRIORITY: 0

: run

XACT 2 PLACED ON FEC AT BLOCK 5 (BLOCK5). RELATIVE CLOCK: 29.9742
: run

XACT 1 POISED AT BLOCK 1 (BLOCK1). RELATIVE CLOCK: 33.1089

: run

XACT 1 PLACED ON FEC AT BLOCK 2 (BLOCK2). RELATIVE CLOCK: 33.1089

**Fresh Dialog**
Figure 5.3, Screen 5

<table>
<thead>
<tr>
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<th>CURRENT</th>
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<tbody>
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<td>1</td>
<td>BLOCK4 GENERATE 30,20</td>
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<tr>
<td>5</td>
<td>1</td>
<td>1</td>
<td>BLOCK5 ADVANCE 20,5</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>0</td>
<td>BLOCK6 TERMINATE 1</td>
</tr>
</tbody>
</table>

S/C: OFF ABS CLOCK: 47.0151 REL CLOCK: 47.0151 TTG: 5

XACT: 2 CURBLK: BLOCK5 NEXTBLK: BLOCK6 CHAINS: CEC PC:
MARK-TIME: 29.9742 MOVE-TIME: ----- PRIORITY: 0

: run
XACT 1 POISED AT BLOCK 1 (BLOCK1). RELATIVE CLOCK: 33.1089
: run
XACT 1 PLACED ON FEC AT BLOCK 2 (BLOCK2). RELATIVE CLOCK: 33.1089
:run
XACT 2 POISED AT BLOCK 6 (BLOCK6). RELATIVE CLOCK: 47.0151

Fresh Dialog
Figure 5.3, Screen 6

<table>
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<tbody>
<tr>
<td>4</td>
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<td>BLOCK4 GENERATE 30,20</td>
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<tr>
<td>5</td>
<td>1</td>
<td>BLOCK5 ADVANCE 20,5</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>BLOCK6 TERMINATE 1</td>
</tr>
</tbody>
</table>

S/C: OFF  ABS CLOCK: 47.0151  REL CLOCK: 47.0151  TTG: 4

XACT: 2  CURBLK: BLOCK5  NEXTBLK: BLOCK6  CHAINS:  PC:

MARK-TIME: 29.9742  MOVE-TIME: -----  PRIORITY: 0

: run

XACT 1 PLACED ON FEC AT BLOCK 2 (BLOCK2). RELATIVE CLOCK: 33.1089
: run

XACT 2 POISED AT BLOCK 6 (BLOCK6). RELATIVE CLOCK: 47.0151

: run

XACT 2 DESTROYED AT BLOCK 6 (BLOCK6). RELATIVE CLOCK: 47.0151

:
The

\texttt{trap clock=clock\_time}

and

display traps

Test-Mode Commands

\begin{verbatim}
trap clock=clock_time
run

trap clock=291.3
run

trap clock 291.3
run

display traps
\end{verbatim}
Fundamental Scan-Phase Logic Commented to Show the Point at Which a Clock Trap is Sprung
(Figure 5.6)

Scan Phase

If a scan trap is set, give control to the user

No

Is there an Xact at the front of the CEC?

Yes

(A)

If a clock trap is set and the clock's current value equals or exceeds the clock-trap value, disable the trap and give control to the user

Move this Transaction as far along its path as possible

Nonzero ADVANCE => put this Xact on the FEC
TERMINATE => destroy this Xact

Is the model's Termination Counter ≤ 0 ?

Yes

Simulation Report

No

(6)

Is there a sequential Transaction on the CEC?

Yes

No

Clock Update Phase
A Model File to Demonstrate

*next and *system Traps

(Figure 5.3)

```
SIMULATE

* 
BLOCK1 GENERATE 40,15
BLOCK2 ADVANCE 25,10
BLOCK3 TERMINATE 1

* 
BLOCK4 GENERATE 30,20
BLOCK5 ADVANCE 20,5
BLOCK6 TERMINATE 1

* 
START 5
END
```
Figure 5.6, Screen 1
The First of Four Computer Screens Produced by Running the Figure 5.3 Model File in Test Mode

<table>
<thead>
<tr>
<th>BLOCK CURRENT</th>
<th>TOTAL</th>
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<tbody>
<tr>
<td>1</td>
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<tr>
<td>2</td>
<td>1</td>
<td>BLOCK2 ADVANCE 25,10</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>BLOCK3 TERMINATE 1</td>
</tr>
</tbody>
</table>

S/C: OFF  ABS CLOCK: 61.7289  REL CLOCK: 61.7289  TTG: 4

XACT: 4  CURBLK: BIRTH  NEXTBLK: BLOCK1  CHAINS: CEC  PC:
MARK-TIME:  MOVE-TIME: -----  PRIORITY: 0

4115 ANNANDALE ROAD
ANNANDALE, VIRGINIA 22003, USA

Ready!

: trap clock 50
: run

XACT 4 POISED AT BLOCK 1 (BLOCK1). RELATIVE CLOCK: 61.7289
CLOCK >= 50.0000 BREAKPOINT.

Dialog After "Ready!" Prompt
**Figure 5.6, Screen 2**

*(set tv off, then display cec fec)*

---

```
Ready!
  : trap clock 50
  : run

XACT 4 POISED AT BLOCK 1 (BLOCK1). RELATIVE CLOCK: 61.7289
CLOCK >= 50.0000 BREAKPOINT.

  : display cec fec

---

**Fresh Dialog**

**CURRENT EVENTS CHAIN**

<table>
<thead>
<tr>
<th>XACT</th>
<th>CURBLK</th>
<th>NXTBLK</th>
<th>CHAINS</th>
<th>SDPGFT**</th>
<th>MARK-TIME</th>
<th>MOVE-TIME</th>
<th>PRIORITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>BIRTH</td>
<td>BLOCK1</td>
<td>CEC</td>
<td></td>
<td>---</td>
<td>61.7289</td>
<td>0</td>
</tr>
</tbody>
</table>

**FUTURE EVENTS CHAIN**

<table>
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<tr>
<th>XACT</th>
<th>CURBLK</th>
<th>NXTBLK</th>
<th>CHAINS</th>
<th>SDPGFT**</th>
<th>MARK-TIME</th>
<th>MOVE-TIME</th>
<th>PRIORITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BLOCK2</td>
<td>BLOCK3</td>
<td>FEC</td>
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<td>33.1089</td>
<td>63.4776</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>BIRTH</td>
<td>BLOCK4</td>
<td>FEC</td>
<td></td>
<td>---</td>
<td>69.5650</td>
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</tr>
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</table>
```
Figure 5.6, Screen 3

<table>
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<tbody>
<tr>
<td>4</td>
<td>2</td>
<td></td>
<td>BLOCK4 GENERATE 30,20</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td></td>
<td>BLOCK5 ADVANCE 20,5</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td></td>
<td>BLOCK6 TERMINATE 1</td>
</tr>
</tbody>
</table>

S/C: OFF  ABS CLOCK: 85.4904  REL CLOCK: 85.4904  TTG: 3

XACT: 3  CURBLK: BLOCK5  NEXTBLK: BLOCK6  CHAINS: CEC  PC: 0
MARK-TIME: 69.5650  MOVE-TIME: -----  PRIORITY: 0

<table>
<thead>
<tr>
<th>XACT</th>
<th>CURBLK</th>
<th>NEXTBLK</th>
<th>CHAINS</th>
<th>SDPGFT**</th>
<th>MARK-TIME</th>
<th>MOVE-TIME</th>
<th>PRIORITY</th>
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<tbody>
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<td>FEC</td>
<td>---</td>
<td>69.5650</td>
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</tbody>
</table>

: trap clock 75

: run

XACT 3 POISED AT BLOCK 6 (BLOCK6). RELATIVE CLOCK: 85.4904
CLOCK >= 75.0000 BREAKPOINT.

Fresh Dialog
Figure 5.7, Screen 4

Fresh Dialog

<table>
<thead>
<tr>
<th>XACT</th>
<th>CURBLK</th>
<th>NXTBLK</th>
<th>CHAINS</th>
<th>SDPGFT**</th>
<th>MARK-TIME</th>
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</thead>
<tbody>
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<td>3</td>
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