SINGLE SWITCH TASKS WITH CHILDREN:
ANALYSIS CONSIDERATIONS

APPENDIX
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The software which controls the computerised cause and effect task as a subject interacts with it is divided into two separate programs. There is a foreground control task (written in high level FORTH) and a background interrupt-driven data gathering task (written in machine code). These two independent tasks both operate according to a simple multitasking system. The tasks synchronize their activities and communicate their states to each other by means of semaphore variables. These are variables written to by one of the programs as soon as it changes its own internal status in any way. The other program reads the semaphore at its own leisure, when it needs the information.

Data Gathering Task

All time critical processing is performed by a routine activated by a hardware generated interrupt, synchronised with the end of the screen update every 1/50 second. This interrupt stops the activity of the processor, and executes a low level machine language routine via an address vector. The interrupt routine has the responsibility for saving the status of the processor, executing its own code, restoring the processor status, and gracefully restarting the main program again. The speed and regularity of the interrupt routine means that it can be regarded as executing "simultaneously" with the main routine.
APPENDIX 2

The first timing task, carried out at the start of each interrupt is to increment a counter. This counter then acts as a software real-time clock, providing measurements accurate to within 20 milliseconds. Next, switch status is polled and if a change is detected the clock time is recorded. The time is also recorded whenever the control routine semaphores that it is starting a reward period, as is the particular value of the semaphore, which is then reset to zero. (This provides the data gathering routine with the capability to collect comparable data from more complex tasks, which can signal various changes in their state by storing different values in this semaphore location.) The interrupt routine stops collecting data once it has recorded 255 values.
\*interrupt_routine*
SAVE_REGISTERS
Clock := Clock + 1
\ continue only if no data overflow will occur
IF Data_full_flag .NE. True
THEN
  \ gather reward data
  IF Event_flag .NE. 0
  THEN
    Event_type_array ( Event_index ) := Event_flag
    Event_time_array ( Event_index ) := Clock
    Event_flag := 0
  \ reset so more can be detected
  Event_index := Event_index + 1
  ENDIF
ENDIF
\ gather switch data
IF SWITCH .NE. Last_switch_state
THEN
  Last_switch_state := SWITCH
  Switch_time_array ( Switch_index ) := Clock
  Switch_index := Switch_index + 1
  \ prevent data overflow
  IF Switch_index .EQ. 256
  THEN
    data_full_flag := True
  ENDIF
ENDIF
ENDIF
RESTORE_REGISTERS
EXIT

Pseudo-code representation of the algorithm for the data gathering interrupt routine.
Control Task

In contrast to the rapidly executing interrupt routine, the surface control program is written in a slower executing high level language and devotes most of its resources to controlling reward presentation. When it needs to know about the occurrence of an event or the passing of time duration, it looks up the semaphore variables continually updated by the interrupt routine. It reacts when the contents of semaphores have passed a critical value or changed from their last known value.

The control routine begins with all rewards turned off and can move into one of two states: reward delivery and ending. The task ends if either the clock semaphore exceeds five minutes or a semaphore indicates that the data collecting routine has reached its limits for data storage. Reward activation occurs when a semaphore indicates switch activity. This semaphore is actually the offset index increased by the data gathering routine every time it stores the time of a switch state change. After rewards have been activated, run for their duration, and deactivated, the control routine re-reads and records the value of this index again. Any change from this new value will indicate more switch activity while the reward is inactive, triggering yet another reward. To allow recording of the precise timing of the start of reward activation, the control program sets a semaphore just before it begins the reward.
\*surface_program*
\ initialization
Event_flag := 0
Event_index := 0
Switch_index := 0
Clock := 0
Switch_count := 0
Data_full_flag := False
Last_switch_state := Off
START_INTERRUPT_PROGRAM
\ main loop
BEGIN
  IF Switch_index .GT. switch_count
    \ a response has been signaled by the interrupt program
    Event_flag := 255
    \ semaphore set to enable time to be recorded
    START_REWARD
    WAIT
    \ for the preset time period
    STOP_REWARD
    Switch_count := Switch_index
  ENDIF
  IF Data_full_flag .EQ. False AND Clock .LT. 5_minutes
  THEN
    REPEAT
    STOP_INTERRUPT_PROGRAMME
    SAVE_DATA
  END
Pseudo-code representation of the algorithm for the high level control task.
Psuedo-code Listing Conventions

- All comments are in lowercase on a line preceded by a backslash
e.g.\ 
  \ a typical comment

- Data storage structures have lower case names but begin with a capital letter.
e.g.
  Clock
  Event_flag

- Control structures are shown in uppercase and underlined.
e.g.
  BEGIN REPEAT
  IF THEN ENDIF

- Boolean truth tests follow FORTRAN conventions.
e.g.
  .EQ. .NE. .GT. .LT.

- Executable procedural statements are in uppercase.
e.g.
  START_INTERRUPT
  WAIT

- Assignment is denoted with the target data structure to the right and the value to be assigned to the left.
e.g.
  Clock := 0
APPENDIX TWO

DATA TABLES FOR CASE STUDY ONE

This appendix contains numeric tables of the raw data for the first case study which involved a pictorial reward version of the cause and effect task. Each line beginning with an asterix ("*") denotes data for a separate reward period. Immediately following each asterix is the time of the switch state change which initiated the reward period. All subsequent switch state change times within that reward period appear on the same line, or an indented following line. All values are times of a change of switch state as an offset from the start of the task. Times are stated in intervals of 1/50 of a second (jiffies). Following each time is either a "v" indicating that the switch was pressed or a "\" to indicate a switch release.
Batch 1

* 3099v 3107
* 3815v 3828
* 4129v 4142
* 4876v 4888 5086v 5098
* 5506v 5525
* 6145v 6163
* 6764v 6785
* 7304v 7316
* 8060v 8119 8135v 8145 8170v 8171 817v 8187v 8189
* 8203v 8206 8217v 8221
* 8398v 8417
* 8735v 8748
* 9459v 9479 9620v
* 9791
* 10537v 10568 10607v 10725
* 10847v 10873 10979v
* 11617 11630v 11646 11669v 11688 11721v 11724 11735v 11738
* 11963v 11987 11996v 12005 12016v 12021 12031v 12035
* 12069v 12091
* 12600v 12731
* 13045v 13173 13225v 13230
* 13453v
* 13789 13792v 13850 13864v 13898 13984v
* 14114 14360v 14387
* 14423v 14534
Batch 2

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* 1284v*
* 3279*
* 4169v 4185*
* 4726v 4775*
* 5578v 5599*
* 6835v 6839 6942v 7004*
* 7517v 7574 7664v 7776*
* 7913v 7929*
* 8258v 8266 8316v 8322 8323v 8324 8327v 8328*
* 8848v 8855*
* 9306v 9329*
* 9931v 9937*
* 10299v 10304 10307v 10308*
* 10698v 10701 10706v 10710 10715v 10716*
* 11626v 11635 11640v 11641*
* 12488v 12497 12515v 12517 12527v 12531*
* 12915v 12943*
* 13907v 13912*
* 14321v 14324 14331v 14336 14346v 14583 14584v 14585*
* 14642v*
* 14959*
Batch 4

* 211v 213^ 215v 233^  
* 949v 966^  
* 2605v 2608^ 2614v 2622^ 2682v 2715^  
* 4161v 4175^  
* 4673v 4689^ 4697v 4699^ 4701v 4713^ 4714v 4715^  
* 5200v 5202^ 5210v 5211^  
* 5763v 5769^ 5770v 5771^ 5790v 5791^ 5792v 5797^  
  5843v 5918^  
* 6355v 6359^  
* 6668v 6810^ 6830v 6836^ 6862v 6896^  
* 7172v 7189^  
* 8005v 8023^  
* 9125v 9136^  
* 10306v 10309^ 10310v 10313^ 10318v 10319^ 10321v 10323^  
* 11270v 11271^ 11275v 11276^ 11277v 11283^ 11284v 11290^  
  11291v 11292^  
* 12749v 12757^ 12763v 12771^ 12779v 12790^ 12791v 12801^  
* 14039v 14042^ 14058v 14067^  
* 14538v 14545^ 14570v 14571^ 14581v 14584^
Batch 5

* 500v 503^ 529v 537^ 566v 575^ 638v 657^  
* 1198v 1224^  
* 1559v  
* 1845^ 1908v  
* 2313^  
* 3056v  
* 3337^ 3537v  
* 4006^ 4279v  
* 4344^  
* 5338v 5496^  
* 6163v 6215^  
* 6585v 6621^ 6791v  
* 6908^ 6995v 7038^  
* 7780v 7813^  
* 9703v 9722^ 9847v 9875^ 9900v 9962^ 9975v  
* 10172^ 10185v  
* 10578^ 10617v 10635^ 10723v 10790^  
* 10999v 11238^  
* 11423v 11494^  
* 13110v  
* 13450^ 13536v 13688^ 13706v  
* 13725^  
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Batch 6

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* 667^
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* 10497v 10501^ 10531v 10592^ 10698v 10719^ 10743v
* 10805^
* 11617v 11637^ 11851v
* 11976^
* 12627v 12635^
* 13033v
* 13661^
* 14109v
* 14916^ 14943v
### APPENDIX 14

**Batch 7**

| *   | 1804v | 1852^ |  *   | 2085v | 2108^ | 2167v | 2196^ |  *   | 2441v | 2532^ | 2621v | 2697^ |  *   | 2821v | 2921^ | 2963v | 3045^ | 3060v | 3092^ |  *   | 3173v | 3269^ | 3295v | 3372^ | 3385v | 3409^ | 3421v |  *   | 3447^ | 3453v | 3558^ | 3592v |  *   | 3731^ | 3802v | 3844^ | 3935v |  *   | 4006^ | 4021v | 4169^ |  *   | 4357v | 4463^ |  *   | 4706v | 4830^ |  *   | 4984v | 5058^ |  *   | 5280v | 5351^ | 5390v | 5449^ | 5461v | 5484^ | 5495v | 5521^ | 5533v |  *   | 5556^ | 5564v | 5590^ | 5597v | 5703^ | 5802v |  *   | 5877^ | 5902v | 5996^ | 6117v |  *   | 6158^ | 6166v | 6186^ | 6208v | 6289^ | 6308v | 6344^ | 6354v |  *   | 6379^ | 6391v | 6416^ | 6422v |  *   | 6451^ | 6463v | 6480^ | 6492v | 6586^ | 6669v |  *   | 6869^ | 6878v | 6906^ | 7072v |  *   | 7129^ | 7264v |  *   | 7594^ | 7603v | 7626^ | 7633v | 7697^ |  *   | 7938v | 7998^ |  *   | 8484v |  *   | 8842^ | 8882v | 8917^ | 9112v |  *   | 9142^ | 9168v | 9212^ | 9237v | 9263^ | 9274v | 9296^ | 9300v |  *   | 9328^ | 9334v | 9350^ | 9363v | 9386^ | 9401v |  *   | 9426^ | 9443v | 9476^ | 9590v | 9653^ | 9668v |  *   | 9740^ | 9750v | 9770^ | 9784v | 9808^ | 9848v | 10009^ |  *   | 10031v | 10065^ | 10105v | 10156^ | 10169v | 10198^ | 10208v | 10285^ | 10298v |  *   | 10320^ | 10333v | 10359^ | 10378v | 10409^ | 10425v |  *   | 10616^ | 10657v | 10771^ | 10787v | 10812^ | 10824v | 10850^ | 10864v |  *   | 10895^ | 10898v | 10933^ | 10980v | 11163^ |  *   | 11177v | 11292^ |  *   | 11480v | 11512^ |  *   | 11860v | 11876^ |  *   | 12244v | 12289^ | 12313v | 12469^ |  *   | 12544v | 12629^ |  *   | 12962v | 13018^ |
**APPENDIX 15**

**Batch 8**

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Batch 9

* 10v  22^  
* 1758v 1767^  
* 2339v 2467^  
* 4022v 4069^  
* 4859v 4884^ 4886v 4891^  
* 8708v 8790^  
* 9175v 9416^  
* 10335v 10580^ 10608v  
* 10625^ 10629v 10637^  
* 12508v 12515^
## Batch 10

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APPENDIX 18

Batch 11

* 83v 105° 121v 161° 314v
* 593°
* 1857v 2070°
* 2426v
* 2854°
* 3178v 3208°
* 3558v 3608°
* 5150v 5167°
* 6505v 6722°
* 8161v
* 8590° 8838v
* 8874° 9054v 9119°
* 9194v 9202°
* 10672v 10816°
* 11083v 11200°
* 12219v 12302°
* 12976v 13063°
* 13548v 13574°
* 13961v 13978°
* 14688v 14702°
APPENDIX 19

Batch 12

* 1569v 1581^*  
* 2341v 2347^*  
* 2962v 2968^* 2971v 3003^*  
* 3952v 3996^*  
* 4696v 4726^*  
* 5162v 5167^* 5181v 5207^* 5208v 5209^*  
* 5933v 5943^* 5950v 5962^*  
* 6426v 6453^*  
* 7308v 7311^* 7328v 7329^* 7331v 7339^*  
* 7747v 7791^*  
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14323v 14324^* 14326v 14327^* 14329v 14330^* 14336v 14337^*  
14340v 14341^* 14345v 14346^*  
* 14703v 14704^* 14705v 14708^* 14709v 14720^* 14721v 14744^*  
14745v 14756^*
APPENDIX THREE
BAR GRAPHS FROM CASE STUDY ONE

This appendix contains bar graph displays as explained in Chapter VIII. In these displays the duration that the switch is in the alternating up and down states, is shown by the length of bars on the graph. Bars rising above the mid-line depict intervals in which the switch is up, and times for which the switch is held down, are shown in offset bars that fall below the mid-line. The vertical axis is marked in intervals of one second and times are plotted with a resolution of 2/50ths of a second. Reward periods are separated by gaps along the horizontal axis between runs of bars, and are numbered sequentially from the start of the task. These numbers are placed at the end of the last state duration bar of a period. The terminal black shaded area, within each last state duration bar for a reward period, denotes time during which the reward was inactive.
Batch 1
Batch 3

APPENDIX 23
Batch 5
Batch 6
APPENDIX 29

Batch 9

[Graph showing time (seconds) vs. switch status (pressed or released)]
Batch 11
Batch 1

\[ \text{Batch 1} \]

\[ :0123456789012345678901: \]

\[ \begin{align*}
&\begin{array}{ll}
&\text{UP} \\
&\text{DN} \\
&\text{ALT?} \\
&\text{ADD} \\
&\text{ALT1} \\
&\text{ALT} \\
&\text{UNAMBIGUOUS} \\
&\text{OPTIMAL}.ALT \\
&\text{SIMPLE}.ALT \\
&\text{FAST}.ALT \\
&\text{SLOW}.ALT \\
&\text{*ALT}
\end{array}
\end{align*} \]

\[ :0123456789012345678901: \]

\[ \begin{align*}
&\begin{array}{ll}
&\text{RELEASE} \\
&\text{ENDS_UP} \\
&\text{SIMPLE}.P/R \\
&\text{PAUSED} \\
&\text{OPTIMAL}.P/R \\
&\text{FEW}.P/R \\
&\text{*FAST}.P/R \\
&\text{SLOW}.P/R \\
&\text{*P/R}
\end{array}
\end{align*} \]

\[ :0123456789012345678901: \]

\[ \begin{align*}
&\begin{array}{ll}
&\text{HOLD} \\
&\text{ENDS_DN} \\
&\text{SIMPLE}.HOLD \\
&\text{PAUSED}.D.N \\
&\text{OPTIMAL}.HOLD \\
&\text{FEW}.HOLD \\
&\text{FAST}.HOLD \\
&\text{SLOW}.HOLD \\
&\text{*HOLD}
\end{array}
\end{align*} \]

\[ :0123456789012345678901: \]

\[ \begin{align*}
&\begin{array}{ll}
&\text{RUN} \\
&\text{NO_TAIL} \\
&\text{QUICK}.DN \\
&\text{QUICK}.UP \\
&\text{*RUN}
\end{array}
\end{align*} \]

\[ :0123456789012345678901: \]

\[ \begin{align*}
&\begin{array}{ll}
&\text{ALT} \\
&\text{P/R} \\
&\text{HLD} \\
&\text{RUN}
\end{array}
\end{align*} \]
Batch 2

0123456789012345678901234:-----------------------------------

*:0123456789012345678901234:-----------------------------------

*:0123456789012345678901234:-----------------------------------

*:0123456789012345678901234:-----------------------------------

*:0123456789012345678901234:-----------------------------------
**APPENDIX 36**

**Batch 3**

| **0123456789012345678901**:----------------------------------- |
| **UP**             | **DN**               |
| **ALT?**          | **ADD**              |
| **ALT1**         | **ALT**             |
| **UNAMBIGUOUS** | **OPTIMAL.ALT**     |
| **SIMPLE.ALT**  | **FAST.ALT**        |
| **SLOW.ALT**    | **ALT**             |

| **0123456789012345678901**:----------------------------------- |
| **RELEASE**      | Often Runs          |
| **ENDS_UP**      | Always Runs         |
| **SIMPLE.P/R**   | Often Clusters      |
| **PAUSED**       | Often Runs          |
| **OPTIMAL.P/R**  | Often Runs          |
| **FEW.P/R**      | Often Runs          |
| **FAST.P/R**     | Sometimes Runs      |
| **SLOW.P/R**     | Sometimes Runs      |

| **0123456789012345678901**:----------------------------------- |
| **HOLD**          | Infrequent Clusters |
| **ENDS_DN**       | Sometimes Runs      |
| **SIMPLE.HOLD**   | Sometimes Runs      |
| **PAUSED.DN**     | Sometimes Runs      |
| **OPTIMAL.HOLD**  | Sometimes Runs      |
| **FEW.HOLD**      | Sometimes Runs      |
| **FAST.HOLD**     | Sometimes Clusters  |
| **SLOW.HOLD**     | Sometimes Isolated  |

| **0123456789012345678901**:----------------------------------- |
| **RUN**           | Infrequent Runs     |
| **NO_TAIL**       | Sometimes Isolated  |
| **QUICK_DN**      | Sometimes Runs      |
| **QUICK_UP**      | Sometimes Isolated  |

| **0123456789012345678901**:----------------------------------- |
| **ALT**           | Never None Absent   |
| **P/R**           | Often Runs Major (good) |
| **HLD**           | Infrequent Runs Minor (good) |
| **RUN**           | Infrequent Runs Minor |

| **0123456789012345678901**:----------------------------------- |
| **UNCLAIMED**     |                     |
Batch 4

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APPENDIX 38

Batch 5

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:DN

:ALT?

:ADD

:ALT1

:ALT

:UNAMBIGUOUS

:OPTIMAL. ALT

:SIMPLE. ALT

:FAST. ALT

:SLow. ALT

:ALT

:RELEASE

:ENDS_UP

:SIMPLE. P/R

:PAUSED

:OPTIMAL. P/R

:FEW. P/R

:FAST. P/R

:SLow. P/R

:*P/R

::*HOLD

::*ENDS-PN

::*SIMPLE. HOLD

::*PAUSED. DN

::*OPTIMAL. HOLD

::*FEW. HOLD

::*FAST. HOLD

::*SLow. HOLD

::*HOLD

:RUN

:NO_TAIL

:QUICK_DN

:QUICK_UP

:*RUN

:ALT

:P/R

:HLD

:RUN

:UNCLAIMED
Batch 6

:0123456789012345678901234567:-----------------------------------
: * * * * * * * * * :UP
: * * * * * * * * :DN
: * * * * * * * * :ALT?
: * * * * * * * * * * :ADD
: * * * * * * * * * * * :ALT1
: * * * * * * * * * :ALT
: * * * * * * * :UNAMBIGUOUS
: * * * * * :OPTIMAL_ALT
: * * :SIMPLE_ALT
: * * * :FAST_ALT
: * * * * :SLOW_ALT
: * * * * * * :ALT

:0123456789012345678901234567:-----------------------------------
: * * * * * * * * * :RELEASE
: * * * * * * * :ENDS_UP
: * * * * * * * :SIMPLE.P/R
: * * * * * * * :PAUSED
: * * * * * * * :OPTIMAL.P/R
: * * * * * * * :FAST.P/R
: * * * * * * * :SLOW.P/R
: * * * * :*P/R

:0123456789012345678901234567:-----------------------------------
: * * * * * * * * * :HOLD
: * * * * * :ENDS_DN
: * * :SIMPLE.HOLD
: * * :PAUSED.DN
: * * :OPTIMAL.HOLD
: * * :FAST.HOLD
: * * :SLOW.HOLD
: * * * * :*HOLD

:0123456789012345678901234567:-----------------------------------
: * * * * * * :RUN
: * * :NO_TAIL
: * :QUICK_DN
: :QUICK_UP
: * :*RUN

:0123456789012345678901234567:-----------------------------------
: * * * * * * * :ALT
: * * * * * * * :P/R
: * * * * * * * :HLD
: * * * * * * * :RUN

:0123456789012345678901234567:-----------------------------------
: * * * * * * * :UNCLAIMED
### APPENDIX 40

#### Batch 7

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<td>Good</td>
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<td>Always Clusters</td>
<td></td>
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<td>Always Clusters</td>
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</tr>
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<td><strong>SLOW ALT</strong></td>
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<td></td>
</tr>
<tr>
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<td>Often Clusters</td>
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<td>Infrequent Mixed</td>
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<td><strong>ENDS DN</strong></td>
<td>Sometimes Runs</td>
<td></td>
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</tr>
<tr>
<td><strong>PAUSED DN</strong></td>
<td>Sometimes Runs</td>
<td></td>
</tr>
<tr>
<td><strong>OPTIMAL HOLD</strong></td>
<td>Sometimes Runs</td>
<td></td>
</tr>
<tr>
<td><strong>FEW HOLD</strong></td>
<td>Sometimes Runs</td>
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<td>Always Mixed</td>
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<td>Never None</td>
<td></td>
</tr>
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<td><strong>RUN</strong></td>
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<td><strong>NO TAIL</strong></td>
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</tr>
<tr>
<td><strong>P/R</strong></td>
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<td></td>
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<td></td>
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<td>Notable</td>
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<td>Infrequent Runs</td>
<td>Minor</td>
</tr>
<tr>
<td><strong>RUN</strong></td>
<td>Sometimes Clusters</td>
<td>Notable (good)</td>
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Batch 8

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<td><strong>release</strong></td>
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<td>Often Mixed</td>
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<td><strong>FEW.P/R</strong></td>
<td>Sometimes Mixed</td>
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<td><strong>NO_TAIL</strong></td>
<td>Inefrequent Isolated</td>
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<td>Sometimes Runs</td>
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<td>Sometimes Runs</td>
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</table>

**APPENDIX 41**
Batch 9

:012345678:----------------------------------
:******* *:UP
 : ** :DN
 : * :ALT?
 : * * :ADD
 : *** :ALT1
 : ALT
 : UNAMBIGUOUS
 : OPTIMAL. ALT
 : SIMPLE. ALT
 : FAST. ALT
 : SLOW. ALT
 : *ALT
:012345678:----------------------------------
:******* *:RELEASE Often Block
:******* *:ENDS_UP Always Block
:******* *:SIMPLE.P/R Always Block
:******* *:PAUSED Always Block
: **** ** :OPTIMAL.P/R Often Runs
:******* *:FEW.P/R Always Block
 : * :FAST.P/R Infrequent Isolated
:******* * :SLOW.P/R Often Runs
:******* * * :P/R
:012345678:----------------------------------
 : ** :HOLD Sometimes Runs
 : ** :ENDS_DN Never None
 : * :SIMPLE.HOLD Sometimes Isolated
 : * :PAUSED.DN Sometimes Isolated
 : ** :OPTIMAL.HOLD Sometimes Isolated
 : ** :FEW.HOLD Always Runs
 : * :FAST.HOLD Sometimes Isolated
 : * :SLOW.HOLD Sometimes Isolated
 : ** :*HOLD
:012345678:----------------------------------
 : RUN
 : :NO_TAIL
 : :QUICK_DN
 : :QUICK_UP
 : *RUN
:012345678:----------------------------------
 : ALT Never None Absent
:******* * :P/R Often Block Major (good)
 : * :HLD Infrequent Isolated Notable (poor)
 : RUN Never None Absent
 : :UNCLAIMED
Batch 10

:012345678901234567890123456:

*:UP
*:DN
*:ALT?
*:ADD
*:ALT1
*:ALT
*:UNAMBIGUOUS
*:OPTIMAL.ALT
*:SIMPLE.ALT
*:FAST.ALT
*:SLOW.ALT
*:ALT

:012345678901234567890123456:

*:RELEASE
*:ENDS_UP
*:SIMPLE.P/R
*:PAUSED
*:OPTIMAL.P/R
*:FEW.P/R
*:FAST.P/R
*:SLOW.P/R
*:P/R

:012345678901234567890123456:

*:HOLD
*:ENDS_DN
*:SIMPLE.HOLD
*:PAUSED.DN
*:OPTIMAL.HOLD
*:FEW.HOLD
*:FAST.HOLD
*:SLOW.HOLD
*:HOLD

:012345678901234567890123456:

*:RUN
*:NO_TAIL
*:QUICK_DN
*:QUICK_UP
*:RUN

:012345678901234567890123456:

*:ALT
*:P/R
*:HLD
*:RUN
*:UNCLAIMED
Batch 11

:0123456789012345678:----------------------------------
: *** ***** *********:UP
: * * * * * * * * * * * * * :DN
: * * * * * * * * * * * * * :ALT?
: * * * * * * * * * * * * * :ADD
: * * * * * * * * * * * * * :ALT1
: * * * * * * * * * * * * * :ALT
: * * * * * * * * * * * * * :UNAMBIGUOUS
: * * * * * * * * * * * * * :OPTIMAL. ALT
: * * * * * * * * * * * * * :SIMPLE. ALT
: * * * * * * * * * * * * * :FAST. ALT
: * * * * * * * * * * * * * :SLOW. ALT
: * * * * * * * * * * * * * :ALT

:0123456789012345678:-----------------------------------
: *** ***** *********:RELEASE
: *** ***** *******:ENDS_UP
: *** ***** *******:SIMPLE. P/R
: *** ***** *******:PAUSED
: *** ***** *******:OPTIMAL. P/R
: *** ***** *******:FEW. P/R
: * * * * * * * * * * * * * :FAST. P/R
: * * * * * * * * * * * * * :SLOW. P/R
: * * * * * * * * * * * * * :P/R

:0123456789012345678:-----------------------------------
: * * * * * * * * * * * * * :HOLD
: * * * * * * * * * * * * * :ENDS_DN
: * * * * * * * * * * * * * :SIMPLE. HOLD
: * * * * * * * * * * * * * :PAUSED_DN
: * * * * * * * * * * * * * :OPTIMAL. HOLD
: * * * * * * * * * * * * * :FEW. HOLD
: * * * * * * * * * * * * * :FAST. HOLD
: * * * * * * * * * * * * * :SLOW. HOLD
: * * * * * * * * * * * * * :HOLD

:0123456789012345678:-----------------------------------
: * * * * * * * * * * * :RUN
: * * * * * * * * * * * :NO_TAIL
: * * * * * * * * * * * :QUICK_DN
: * * * * * * * * * * * :QUICK_UP
: * * * * * * * * * * * :RUN

:0123456789012345678:-----------------------------------
: *** ***** *********:ALT
: *** ***** *********:P/R
: *** ***** *********:HLD
: *** ***** *********:RUN
: *** ***** *********:UNCLAIMED

:0123456789012345678:-----------------------------------
: *** ***** *********:UNAMBIGUOUS
: *** ***** *********:OPTIMAL. ALT
: *** ***** *********:SIMPLE. ALT
: *** ***** *********:FAST. ALT
: *** ***** *********:SLOW. ALT
: *** ***** *********:ALT

:0123456789012345678:-----------------------------------
: *** ***** *********:RELEASE
: *** ***** *******:ENDS_UP
: *** ***** *******:SIMPLE. P/R
: *** ***** *******:PAUSED
: *** ***** *******:OPTIMAL. P/R
: *** ***** *******:FEW. P/R
: * * * * * * * * * * * * * :FAST. P/R
: * * * * * * * * * * * * * :SLOW. P/R
: * * * * * * * * * * * * * :P/R

:0123456789012345678:-----------------------------------
: *** ***** *********:HOLD
: *** ***** *******:ENDS_DN
: *** ***** *******:SIMPLE. HOLD
: *** ***** *******:PAUSED_DN
: *** ***** *******:OPTIMAL. HOLD
: *** ***** *******:FEW. HOLD
: * * * * * * * * * * * * * :FAST. HOLD
: * * * * * * * * * * * * * :SLOW. HOLD
: * * * * * * * * * * * * * :HOLD

:0123456789012345678:-----------------------------------
: *** ***** *********:ALT
: *** ***** *********:P/R
: *** ***** *********:HLD
: *** ***** *********:RUN
: *** ***** *********:UNCLAIMED

:0123456789012345678:-----------------------------------
: *** ***** *********:UNAMBIGUOUS
: *** ***** *********:OPTIMAL. ALT
: *** ***** *********:SIMPLE. ALT
: *** ***** *********:FAST. ALT
: *** ***** *********:SLOW. ALT
: *** ***** *********:ALT

:0123456789012345678:-----------------------------------
Batch 12

```
:012345678901234567890123456:----------------------------------
:***************************:UP
:DN
:ALT?
:ADD
:ALT1
:ALT
:UNAMBIGUOUS
:OPTIMAL.ALT
:SIMPLe.ALT
:FAST.ALT
:SLOW.ALT
:*ALT

:012345678901234567890123456:-----------------------------------
:********************** *** **:RELEASE Often Runs
:ENDS_UP Often Runs
:SIMPLe.P/R Often Runs
:PAUSED Often Clusters
:OPTIMAL.P/R Sometimes Runs
:FEW.P/R Often Runs
:FAST.P/R Often Clusters
:SLOW.P/R Infrequent Clusters
:*P/R

:012345678901234567890123456:-----------------------------------
:HOLD
:ENDS_DN
:SIMPLe.HOLD
:PAUSED.DN
:OPTIMAL.HOLD
:FEW.HOLD
:FAST.HOLD
:SLOW.HOLD
:*HOLD

:012345678901234567890123456:-----------------------------------
:***************** **** * **:P/R Often Runs Major (good)
:HLD Never Absent
:RUN Infrequent Runs Notable
:UNCLAIMED
```
APPENDIX FIVE

FEATURE BY STRATEGY TABLES FROM CASE STUDY ONE
Batch 1

**STRATEGY FEATURES**

ALTERNATING STRATEGY Absent
PRESS/RELEASE STRATEGY Major
  Major features : Ends up Simple Few
  Notable features : Paused Optimal Fast Slow
  Minor features : Presses
  Absent features : none

HOLDING STRATEGY Minor
  Major features : none
  Notable features : Simple Paused Optimal Fast Slow
  Minor features : none
  Absent features : none

RUNNING STRATEGY Minor (poor)
  Major features : none
  Notable features : Quick down Quick up
  Minor features : none
  Absent features : No tail

Batch 2

**STRATEGY FEATURES**

ALTERNATING STRATEGY Absent
PRESS/RELEASE STRATEGY Notable
  Major features : Ends up Simple Few
  Notable features : Paused Optimal Fast Slow
  Minor features : none
  Absent features : Presses

HOLDING STRATEGY Minor
  Major features : none
  Notable features : Ends down Simple Paused Optimal Few Fast Slow
  Minor features : none
  Absent features : none

RUNNING STRATEGY Minor
  Major features : Quick down
  Notable features : No tail Quick up
  Minor features : none
  Absent features : none
Batch 3

**STRATEGY FEATURES**

ALTERNATING STRATEGY Absent
PRESS/RELEASE STRATEGY Major (good)
Major features :Simple Paused Optimal Few
Notable features :Fast Slow
Minor features :none
Absent features :Presses

HOLDING STRATEGY Minor (good)
Major features :none
Notable features :Ends dn Simple Paused Optimal Few Fast Slow
Minor features :none
Absent features :none

RUNNING STRATEGY Minor
Major features :none
Notable features :No tail Quick dn Quick up
Minor features :none
Absent features :none

Batch 4

**STRATEGY FEATURES**

ALTERNATING STRATEGY Absent
PRESS/RELEASE STRATEGY Major (good)
Major features :Ends up Simple Paused Slow
Notable features :Optimal Few
Minor features :Fast
Absent features :Presses

HOLDING STRATEGY Absent

RUNNING STRATEGY Notable (poor)
Major features :Quick dn
Notable features :none
Minor features :none
Absent features :No tail Quick up
Batch 5

**STRATEGY FEATURES**

ALTERNATING STRATEGY Minor (good)
- Major features: Unambiguous Optimal Simple
- Notable features: Fast Slow
- Minor features: None
- Absent features: None

PRESS/RELEASE STRATEGY Major
- Major features: Ends up Simple Optimal Few
- Notable features: Paused Fast Slow
- Minor features: None
- Absent features: Presses

HOLDING STRATEGY Notable
- Major features: Optimal Few Fast
- Notable features: Ends dn Simple Paused Slow
- Minor features: None
- Absent features: None

RUNNING STRATEGY Minor (poor)
- Major features: None
- Notable features: Quick dn
- Minor features: None
- Absent features: No tail Quick up

Batch 6

**STRATEGY FEATURES**

ALTERNATING STRATEGY Minor (good)
- Major features: Simple
- Notable features: Optimal Fast Slow
- Minor features: None
- Absent features: None

PRESS/RELEASE STRATEGY Major (good)
- Major features: Ends up Simple Paused Optimal Few
- Notable features: Fast Slow
- Minor features: None
- Absent features: Presses

HOLDING STRATEGY Minor
- Major features: None
- Notable features: Ends dn Simple Paused Optimal Fast Slow
- Minor features: None
- Absent features: None

RUNNING STRATEGY Minor
- Major features: None
- Notable features: No tail
- Minor features: None
- Absent features: Quick up
Batch 7

**STRATEGY FEATURES**

ALTERNATING STRATEGY Minor  (good)
Major features :none
Notable features :Optimal Simple
Minor features :none
Absent features :Slow

PRESS/RELEASE STRATEGY Notable
Major features :Ends up Simple Few Fast
Notable features :Paused Optimal
Minor features :Slow
Absent features :Presses

HOLDING STRATEGY Minor
Major features :none
Notable features :Ends dn Simple Paused Optimal Few
Minor features :none
Absent features :Slow

RUNNING STRATEGY Notable (good)
Major features :No tail Quick up
Notable features :Quick dn
Minor features :none
Absent features :none

Batch 8

**STRATEGY FEATURES**

ALTERNATING STRATEGY (good)
Major features :Unambiguous
Notable features :Simple Fast Slow
Minor features :Optimal
Absent features :none

PRESS/RELEASE STRATEGY
Major features :Ends up Simple Fast
Notable features :Paused Optimal Few Slow
Minor features :Presses
Absent features :none

HOLDING STRATEGY
Major features :Ends dn Fast
Notable features :Simple Paused Optimal Few Slow
Minor features :none
Absent features :none

RUNNING STRATEGY (poor)
Major features :none
Notable features :Quick dn Quick up
Minor features :No tail
Absent features :none
**STRATEGY FEATURES**

**ALTERNATING STRATEGY** Absent

PRESS/RELEASE STRATEGY **Major** (good)
- Major features: Ends up, Simple, Paused, Optimal, Few, Slow
- Notable features: none
- Minor features: Fast
- Absent features: Presses

HOLDING STRATEGY **Notable** (poor)
- Major features: none
- Notable features: Simple, Paused, Optimal, Fast, Slow
- Minor features: none
- Absent features: Ends, dN

RUNNING STRATEGY Absent

---

**Batch 10**

**STRATEGY FEATURES**

**ALTERNATING STRATEGY** Absent

PRESS/RELEASE STRATEGY **Notable**
- Major features: Simple
- Notable features: Paused, Optimal, Few, Fast, Slow
- Minor features: none
- Absent features: Presses

HOLDING STRATEGY **Minor**
- Major features: Fast
- Notable features: Ends, dN, Simple, Paused, Slow
- Minor features: none
- Absent features: Optimal, Few

RUNNING STRATEGY **Major**
- Major features: Quick, dN
- Notable features: No tail, Quick, up
- Minor features: none
- Absent features: none

**SUB-GROUP**
012345678901234567890123456
*     ***     ***     ***     ***     :MAJOR GROUP
*** *** *** ***     :NO_TAIL
Batch 11

**STRATEGY FEATURES**
ALTERNATING STRATEGY Absent
PRESS/RELEASE STRATEGY Major (good)
   Major features : Ends up Simple Paused Optimal Few
   Notable features : Fast Slow
   Minor features : none
   Absent features : Presses
HOLDING STRATEGY Minor
   Major features : Simple Paused Optimal Few
   Notable features : Ends dn Fast Slow
   Minor features : none
   Absent features : none
RUNNING STRATEGY Absent

Batch 12

**STRATEGY FEATURES**
ALTERNATING STRATEGY Absent
PRESS/RELEASE STRATEGY Major (good)
   Major features : Ends up Simple Paused Optimal Few
   Notable features : Optimal
   Minor features : Slow
   Absent features : Presses
HOLDING STRATEGY Absent
RUNNING STRATEGY Notable
   Major features : none
   Notable features : none
   Minor features : No tail
   Absent features : Quick up
APPENDIX SIX

SELECT BATCHES FROM CASE STUDY TWO
**STRATEGY FEATURES**

**ALTERNATING STRATEGY** Absent

**PRESS/RELEASE STRATEGY** Major (poor)
- Major features: Fast
- Notable features: Ends up Few Presses
- Minor features: Simple Paused Optimal Slow
- Absent features: None

**HOLDING STRATEGY** Notable (poor)
- Major features: Fast
- Notable features: Ends down Few Slow
- Minor features: None
- Absent features: Simple Paused Optimal

**RUNNING STRATEGY** Minor
- Major features: None
- Notable features: No tail Quick down Quick up
- Minor features: None
- Absent features: None
### Batch 3

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<th>Command</th>
<th>Frequency</th>
<th>Cluster Type</th>
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</tr>
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</tr>
<tr>
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<td>None</td>
</tr>
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<td>Infrequent Clusters</td>
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<tr>
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<td>Runs</td>
</tr>
<tr>
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<td>Runs</td>
</tr>
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</tr>
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<td>Occasionally Runs</td>
<td>Runs</td>
</tr>
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<td>Runs</td>
</tr>
<tr>
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</tr>
<tr>
<td>FAST_ALT</td>
<td>Always</td>
<td>None</td>
</tr>
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<td>SLOW_ALT</td>
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<td>Runs</td>
</tr>
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<td>ENDS_UP</td>
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<td>Runs</td>
</tr>
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<td>Infrequent Isolated</td>
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</tr>
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<td>Runs</td>
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<td>Often</td>
<td>Runs</td>
</tr>
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<td>Runs</td>
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<td>Runs</td>
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<tr>
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</tr>
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<td>Sometimes Runs</td>
<td>Runs</td>
</tr>
<tr>
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<td>Isolated</td>
</tr>
<tr>
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<td>*</td>
<td>*</td>
</tr>
<tr>
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<td>Infrequent Runs</td>
<td>Runs</td>
</tr>
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</tr>
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<td>Isolated</td>
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<tr>
<td>ALT</td>
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<td>None</td>
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<td>P/R</td>
<td>Often</td>
<td>Runs</td>
</tr>
<tr>
<td>HLID</td>
<td>Sometimes Runs</td>
<td>Runs</td>
</tr>
<tr>
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<td>Infrequent Runs</td>
<td>Runs</td>
</tr>
<tr>
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<td></td>
<td></td>
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</table>
Batch 6

**STRATEGY FEATURES**

ALTERNATING STRATEGY Absent
PRESS/RELEASE STRATEGY Major (good)
   Major features: Ends up Simple Paused Optimal Few Fast
   Notable features: none
   Minor features: Slow
   Absent features: Presses

HOLDING STRATEGY Absent
RUNNING STRATEGY Absent
Batch 6

:012345678901234:----------------------------------
:***************:UP
 : :DN
 : :ALT?
 : :ADD
 : :ALT1
 : :ALT
 : :UNAMBIGUOUS
 : :OPTIMAL. ALT
 : :SIMPLE. ALT
 : :FAST. ALT
 : :SLOW. ALT
 : :*ALT

:012345678901234:----------------------------------
:***************:RELEASE
 Always Block

:012345678901234:----------------------------------
:***************:ENDS_UP
 Always Block

:012345678901234:----------------------------------
:***************:SIMPLE. P/R
 Always Block

:012345678901234:----------------------------------
:***************:PAUSED
 Always Block

:012345678901234:----------------------------------
:***************:OPTIMAL. P/R
 Often Block

:012345678901234:----------------------------------
:***************:FEW. P/R
 Always Block

:012345678901234:----------------------------------
:***************:FAST. P/R
 Often Runs

:012345678901234:----------------------------------
:***************:SLOW. P/R
 Infrequent Runs

:012345678901234:----------------------------------
:***************:PRESSES
 Never None

:012345678901234:----------------------------------
:***************:*P/R
 Always Block

:012345678901234:----------------------------------
:***************:HOLD

:012345678901234:----------------------------------
:***************:ENDS_DN

:012345678901234:----------------------------------
:***************:SIMPLE. HOLD

:012345678901234:----------------------------------
:***************:PAUSED. DN

:012345678901234:----------------------------------
:***************:OPTIMAL. HOLD

:012345678901234:----------------------------------
:***************:FEW. HOLD

:012345678901234:----------------------------------
:***************:FAST. HOLD

:012345678901234:----------------------------------
:***************:SLOW. HOLD

:012345678901234:----------------------------------
:***************:*HOLD

:012345678901234:----------------------------------
:***************:RUN

:012345678901234:----------------------------------
:***************:NO_TAIL

:012345678901234:----------------------------------
:***************:QUICK_DN

:012345678901234:----------------------------------
:***************:QUICK_UP

:012345678901234:----------------------------------
:***************:*RUN

:012345678901234:----------------------------------
:***************:ALT
 Never None Absent

:012345678901234:----------------------------------
:***************:P/R
 Always Block Major (good)

:012345678901234:----------------------------------
:***************:HLD
 Never None Absent

:012345678901234:----------------------------------
:***************:RUN
 Never None Absent

:012345678901234:----------------------------------
:***************:UNCLAIMED
Batch 14

**STRATEGY FEATURES**

ALTERNATING STRATEGY Absent
PRESS/RELEASE STRATEGY Major (good)
   Major features : Ends up Simple Paused Optimal Few Fast
   Notable features : none
   Minor features : Slow
   Absent features : Presses

HOLDING STRATEGY Notable
   Major features : none
   Notable features : none
   Minor features : none
   Absent features : Ends on Slow

RUNNING STRATEGY Absent
Batch 14

```
:012345678901234:-----------------------------------
:*****************:*UP
  * ********:*DN
  ********:*ALT?
  ********:*ADD
  ********:*ALT1
  ********:*ALT Octen Clusters
  ** *:*UNAMBIGUOUS Sometimes Runs
  ********:*OPTIMAL. ALT Always Clusters
  ********:*SIMPLE. ALT Always Clusters
  ********:*FAST. ALT Always Clusters
  **:**:*SLOW. ALT Never None

:012345678901234:-----------------------------------
:*****************:*RELEASE Always Block
:*****************:*ENDS_UP Always Block
:*****************:*SIMPLE. P/R Always Block
:*****************:*PAUSED Always Block
:*****************:*OPTIMAL. P/R Always Block
:*****************:*FEW. P/R Always Block
  **:*FAST. P/R Often Runs
  **:*SLOW. P/R Infrequent Runs
  **:*PRESSES Never None

:012345678901234:-----------------------------------
  * *:*HOLD Sometimes Runs
  * *:*ENDS_DN Never None
  * *:*SIMPLE. HOLD Always Runs
  * *:*PAUSED.DN Always Runs
  * *:*OPTIMAL. HOLD Always Runs
  * *:*FEW. HOLD Always Runs
  * *:*FAST.HOLD Always Runs
  * *:*SLOW.HOLD Never None
  * *:*HOLD

:012345678901234:-----------------------------------
  :RUN
  :NO_TAIL
  :QUICK_DN
  :QUICK_UP
  :*RUN

:012345678901234:-----------------------------------
  :ALT Never None Absent
  ********:*P/R Always Block Major (good)
  :HLD Never None Notable
  :RUN Never None Absent
  :UNCLAIMED
```
Batch 19

**STRATEGY FEATURES**

**ALTERNATING STRATEGY** Minor  (good)
- Major features : none
- Notable features : Unambiguous Fast Slow
- Minor features : none
- Absent features : none

**PRESS/RELEASE STRATEGY** Minor  (good)
- Major features : none
- Notable features : Fast Slow
- Minor features : none
- Absent features : Presses

**HOLDING STRATEGY** Major  (good)
- Major features : Ends dn Fast
- Notable features : none
- Minor features : Slow
- Absent features : none

**RUNNING STRATEGY** Absent
Batch 19

:0123456789012345:-----------------------------------
**: **
**:UP
**: **
**:DN
**: **
**ALT?
**: ****
**:ADD
**: ****
**:ALT1
**: ****
**:ALT
**: ****
**:UNAMBIGUOUS
**: ****
**:OPTIMAL.ALT
**: ****
**:SIMPLE.ALT
**: ****
**:FAST.ALT
**: *
**:SLOW.ALT
**: ****
**:ALT

:0123456789012345:-----------------------------------
**: **
**:RELEASE
**: **
**:ENDS_UP
**: **
**:SIMPLE.P/R
**: **
**:PAUSED
**: **
**:OPTIMAL.P/R
**: **
**:FEW.P/R
**: *
**:FAST.P/R
**: *
**:SLOW.P/R
**: *
**:PRESSES
**: ****
**:P/R

:0123456789012345:-----------------------------------
**: **
**:HOLD
**: **
**:ENDS_DN
**: **
**:SIMPLE.HOLD
**: **
**:PAUSED.DN
**: **
**:OPTIMAL.HOLD
**: **
**:FEW.HOLD
**: *
**:FAST.HOLD
**: *
**:SLOW.HOLD
**: ****
**:HOLD

:0123456789012345:-----------------------------------
**: **
**:RUN
**: **
**:NO_TAIL
**: **
**:QUICK_DN
**: **
**:QUICK_UP
**: **
**:RUN

:0123456789012345:-----------------------------------
**: **
**:ALT
**: ****
**:P/R
**: ****
**:HLD
**: *
**:RUN
**: ****
**:UNCLAIMED
**STRATEGY FEATURES**

ALTERNATING STRATEGY Absent
PRESS/RELEASE STRATEGY Major  (poor)
   Major features  :Ends up
   Notable features  :Fast Slow
   Minor features  :Simple Paused Optimal Few Presses
   Absent features  :none

HOLDING STRATEGY Minor  (poor)
   Major features  :none
   Notable features  :none
   Minor features  :none
   Absent features  :Ends dn Simple Paused Optimal Few Slow

RUNNING STRATEGY Notable
   Major features  :Quick dn
   Notable features  :No tail
   Minor features  :none
   Absent features  :Quick up
APPENDIX 65

Batch 24

:0123456789012:----------------------------------
:*************:UP
: * * :DN
: * * :ALT?
: * * * :ADD
: *** *** :ALT1
: :ALT
: :UNAMBIGUOUS
: :OPTIMAL_ALT
: :SIMPLE_ALT
: :FAST_ALT
: :SLOW_ALT
: :*ALT

:0123456789012:----------------------------------
:*************:RELEASE Always Block
:*************:ENDS_UP Often Runs
:* * * :SIMPLE.P/R Infrequent Runs
:* * :PAUSED Infrequent Runs
:* * :OPTIMAL.P/R Infrequent Runs
:*** *** :FEW.P/R Infrequent Clusters
:* *** *** :FAST.P/R Sometimes Runs
: ** *** :SLOW.P/R Sometimes Runs
: * * * :PRESSES Infrequent Runs
:*** *** :*P/R

:0123456789012:----------------------------------
:* * :HOLD Infrequent Runs
:* * :ENDS_DN Never None
:* * :SIMPLE.HOLD Never None
:* * :PAUSED.DN Never None
:* * :OPTIMAL.HOLD Never None
:* * :FEW.HOLD Never None
:* * :FAST.HOLD Always Runs
:* * :SLOW.HOLD Never None
:* * :*HOLD

:0123456789012:----------------------------------
:* * * :RUN Sometimes Runs
:* * :NO_TAIL Sometimes Runs
:* *** :QUICK_DN Often Clusters
:* * :QUICK_UP Never None
:* *** :RUN

:0123456789012:----------------------------------
:* ALT Never None Absent
:**** * ****:*P/R Often Runs Major (poor)
:* * :HLD Infrequent Runs Minor (poor)
:*** * :RUN Sometimes Runs Notable
:* :UNCLAIMED
Batch 27

**STRATEGY FEATURES**
ALTERNATING STRATEGY Absent
PRESS/RELEASE STRATEGY Notable
Major features :none
Notable features :none
Minor features :none
Absent features :Ends up Simple Paused Optimal Few Slow Presses
HOLDING STRATEGY Notable (poor)
Major features :none
Notable features :Ends dn
Minor features :none
Absent features :Simple Paused Optimal Few Slow
RUNNING STRATEGY Major (good)
Major features :No tail
Notable features :Quick dn Quick up
Minor features :none
Absent features :none
APPENDIX 67

Batch 27

:01234567:-----------------------------------
: * * :UP
: * * **:DN
: * :ALT?
: * * :ADD
: *** :ALT1
: ALT
: UNAMBIGUOUS
: OPTIMAL.ALT
: SIMPLE.ALT
:FAST.ALT
: SLOW.ALT
: *ALT

:01234567:-----------------------------------
: * :RELEASE Sometimes Runs
: ENDS_UP Never None
: SIMPLE.P/R Never None
: PAUSED Never None
: OPTIMAL.P/R Never None
: FEW.P/R Never None
: * :FAST.P/R Always Runs
: SLOW.P/R Never None
: PRESSES Never None
: * :P/R

:01234567:-----------------------------------
: * * :HOLD Sometimes Runs
: ENDS_DN Sometimes Clusters
: SIMPLE.HOLD Never None
: PAUSED.DN Never None
: OPTIMAL.HOLD Never None
: FEW.HOLD Never None
: * * **:FAST.HOLD Always Runs
: SLOW.HOLD Never None
: * * *:HOLD

:01234567:-----------------------------------
: * * **:HOLD Sometimes Runs
: ENDS_DN Sometimes Clusters
: SIMPLE.HOLD Never None
: PAUSED.DN Never None
: OPTIMAL.HOLD Never None
: FEW.HOLD Never None
: * * **:FAST.HOLD Always Runs
: SLOW.HOLD Never None
: * * *:HOLD

:01234567:-----------------------------------
:*******:RUN Always Block
:*******:NO_TAIL Often Block
: ** :QUICK_DN Sometimes Runs
: *** * :QUICK_UP Sometimes Runs
:*******:*RUN

:01234567:-----------------------------------
: ALT Never None Absent
: P/R Never None Notable
: * :HLD Infrequent Isolated Notable (poor)
:*******:RUN Always Block Major (good)
: UNCLAIMED
Batch 29

**STRATEGY FEATURES**

ALTERNATING STRATEGY Absent
PRESS/RELEASE STRATEGY Major
  Major features: Ends up Few Fast
  Notable features: Simple Paused Optimal Presses
  Minor features: none
  Absent features: Slow

HOLDING STRATEGY Absent
RUNNING STRATEGY Absent
Batch 29

:\01234567890123456:----------------------------------
:\*ALT
:\*****************:UP
:\DN
:\*:ALT?
:\ADD
:\*:ALT1
:\ALT
:\*:UNambiGuous
:\*:OPTIMAL. ALT
:\*:SIMPLE. ALT
:\*:FAST. ALT
:\*:SLOW. ALT
:\*:ALT
:\01234567890123456:-----------------------------------
:\*****************:RELEASE
:Always Block
:\*****************:ENDS UP
:Always Block
:\**: SIMPLE. P/R
:Sometimes Runs
:\**: PAUSED
:Sometimes Runs
:\**: OPTIMAL. P/R
:Sometimes Runs
:\*****************:FEW. P/R
:Always Block
:\*****************:FAST. P/R
:Always Block
:\*:SLOW. P/R
:Never None
:\**:PRESSES
:Sometimes Runs
:\*****************:P/R
:\01234567890123456:-----------------------------------
:\*:HOLD
:\*:ENDS DN
:\*:SIMPLE. HOLD
:\*:PAUSED. DN
:\*:OPTIMAL. HOLD
:\*:FEW. HOLD
:\*:FAST. HOLD
:\*:SLOW. HOLD
:\*:HOLD
:\01234567890123456:-----------------------------------
:\*:RUN
:\*:NO_TAIL
:\*:QUICK DN
:\*:QUICK_UP
:\*:RUN
:\01234567890123456:-----------------------------------
:\*:ALT
:Never None Absent
:\*:P/R
:Always Block Major
:\*:HLD
:Never None Absent
:\*:RUN
:Never None Absent
:\*:UNCLAIMED
Batch 30

**STRATEGY FEATURES**

ALTERNATING STRATEGY Notable (good)
- Major features: none
- Notable features: Unambiguous Optimal Simple Fast Slow
- Minor features: none
- Absent features: none

PRESS/RELEASE STRATEGY Major
- Major features: Ends up Slow
- Notable features: Simple Paused Optimal Fast
- Minor features: none
- Absent features: Presses

HOLDING STRATEGY Notable
- Major features: none
- Notable features: Ends dn Simple Paused Optimal Fast Slow
- Minor features: none
- Absent features: none

RUNNING STRATEGY Absent
## APPENDIX 71

### Batch 30

| :0123456789:----------------------------------- | **UP** Always | **DN** Block |
| :**********:ALT? Sometimes | **ADD** Runs |
| :**********:ALT1 Sometimes | **ALT** Runs |
| :**********:ALT Sometimes | **UNAMBIGUOUS** Runs |
| :**********:SIMPLE.ALT Sometimes | **FAST.ALT** Runs |
| :**********:ALT1 Sometimes | **SLOW.ALT** Runs |

| :0123456789:----------------------------------- | **RELEASE** Often | **ENDS_UP** Runs |
| :**********:SIMPLE.P/R Sometimes | **PAUSED** Runs |
| :**********:OPTIMAL.P/R Sometimes | **FEW.P/R** Runs |
| :**********:FAST.P/R Sometimes | **SLOW.P/R** Runs |
| :**********:*PRESSES Never | *ALT Sometimes |

| :0123456789:----------------------------------- | **HOLD** Sometimes | **ENDS_DN** Runs |
| :**********:*SIMPLE.HOLD Sometimes | **PAUSED.DN** Runs |
| :**********:*OPTIMAL.HOLD Sometimes | **FEW.HOLD** Runs |
| :**********:*FAST.HOLD Sometimes | **SLOW.HOLD** Runs |
| :**********:*HOLD None | *ALT Sometimes |

| :0123456789:----------------------------------- | **RUN** |
| :**********:*NO_TAIL None |
| :**********:*QUICK_DN Absent |
| :**********:*QUICK_UP Absent |

| :0123456789:----------------------------------- | **ALT** Notable (good) | **P/R** Major |
| :**********:*HLD Runs |
| :**********:*RUN None |

| :0123456789:----------------------------------- | **UNCLAIMED**