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An Event-B Specification of ABS_DISPLAY5 @ Date: 16 Nov 2007 @ Time: 08:19:28 PM
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MACHINE ABS_DISPLAY5

REFINES ABS_DISPLAY4

SEES CDIS_CONTEXT5

VARIABLES

database
page_selections
pages
previous_pages
private_pages
trq
time_now
edd_acks_required
concealed_displays

EVENTS

INITIALISATION

BEGIN

act3 : *page_selections* := \emptyset
act8 : *database* : $\in \text{Attr_id} \rightarrow \text{Attrs}$
act9 : *previous_pages* := \emptyset
act10 : *private_pages* := \emptyset
act1 : *pages* := \emptyset
act11 : *trq* := \emptyset
act12 : *time_now* : $\in \text{Date_time}$
act4 : *edd_acks_required* := \emptyset
act2 : *concealed_displays* := \emptyset

END

EVENT UPDATE_DATABASE

/* This event has been affected by the introduction of Manually_updated flag. */

REFINES UPDATE_DATABASE

ANY

ups
changed_ais
selected_ais

WHERE

grd2 : *ups* $\in \text{Attr_id} \leftrightarrow \text{Attrs}$
grd4 : (*ups*; *last_update*) = *dom*(*ups*) \times {*time_now*}
grd5 : (*ups*; *manually_updated*) = *dom*(*ups*) \times {*FALSE*} /* This new guard reflect the
effect of the manual update flag. For auto updates this should be set to false . */
grd3 : *changed_ais* $\subseteq \text{Attr_id}$
grd6 : *changed_ais* = {*ai* | *ai* $\in \text{dom}(\text{ups}) \wedge \text{value}(\text{database}(\text{ai})) \neq \text{value}(\text{ups}(\text{ai}))$ }
grd1 : *selected_ais* $\in \text{EDD_id} \leftrightarrow \text{Attr_id}$
grd8 : *selected_ais* = *page_selections*; *pages*; *contents*; *fields*; *attr*

THEN

act1 : *database* := *database* \Leftarrow *ups*
act2 : *edd_acks_required* := *edd_acks_required* \cup ((*selected_ais* \triangleright *changed_ais*) \triangleright *Acknowledge*)

END

EVENT SET_DATA_VALUE

/ This event has been affected by the introduction of Manually_updated flag. */*

REFINES SET_DATA_VALUE

ANY

ei
ai
av
a
selected_ais

WHERE

grd1 : ei ∈ EDD_id
grd4 : ei ∈ EDITORS
grd2 : ai ∈ Attr_id
grd3 : av ∈ Attr_value
grd5 : a ∈ Attrs

grd6 : value(a) = av

grd7 : last_update(a) = time_now

grd10 : manually_updated(a) = TRUE */* This new guard reflect the effect of the manual update flag. For manual updates this should be set to true. */*

grd9 : selected_ais ∈ EDD_id ↔ Attr_id

grd8 : selected_ais = page_selections; pages; contents; fields; attr

THEN

act1 : database(ai) := a

act2 : edd_acks_required := edd_acks_required ∪ ((selected_ais ▷ {ai}) ▷ Acknowledge)

END

EVENT DISPLAY_PAGE

REFINES DISPLAY_PAGE

ANY

ei
no

WHERE

grd1 : ei ∈ EDD_id
grd2 : no ∈ Page_number
grd3 : no ∈ dom(pages)

THEN

act1 : page_selections(ei) := no

act2 : edd_acks_required := {ei} ⋈ edd_acks_required

END

EVENT DISMISS_PAGE

REFINES DISMISS_PAGE

ANY

ei

WHERE

grd1 : ei ∈ EDD_id
grd2 : ei ∈ dom(page_selections)

THEN

act2 : page_selections := {ei} ⋈ page_selections

act1 : edd_acks_required := {ei} ⋈ edd_acks_required

act3 : concealed_displays := concealed_displays \ {ei}

END

EVENT ADD_PAGE

REFINES ADD_PAGE

ANY*ei**no**pc**p***WHERE***grd1* : *ei* ∈ *EDD_id**grd2* : *no* ∈ *Page_number**grd3* : *pc* ∈ *Page_contents**grd4* : *ei* ∈ *EDITORS**grd5* : *p* ∈ *Page**grd6* : *contents(p)* = *pc**grd7* : *creation_date(p)* = *time_now***THEN***act1* : *private_pages(no)* := *p***END****EVENT RELEASE_PAGE****REFINES** RELEASE_PAGE**ANY***no**selected_ais**pc1**pc2***WHERE***grd1* : *no* ∈ *Page_number**grd2* : *no* ∈ *dom(private_pages)**grd3* : *no* ∈ *dom(pages)**grd5* : *pc1* = *contents(pages(no))**grd6* : *pc2* = *contents(private_pages(no))**grd4* : (*pc1* ∈ *Overlay_Page_contents* ⇒ *pc2* ∈ *Overlay_Page_contents*)*grd8* : *selected_ais* ∈ *EDD_id* ↔ *Attr_id**grd7* : *selected_ais* = (*page_selections* ▷ {*no*}); *private_pages*; *contents*; *fields*; *attr***THEN***act1* : *pages(no)* := *private_pages(no)**act3* : *previous_pages(no)* := *pages(no)**act2* : *private_pages* := {*no*} ◁ *private_pages**act5* : *edd_acks_required* := *edd_acks_required* ◁ ((*selected_ais* ▷ *Acknowledge*) ∩ *edd_acks_required*)**END****EVENT RELEASE_PAGE_CURRENT****REFINES** RELEASE_PAGE_CURRENT**ANY***no**selected_ais***WHERE***grd1* : *no* ∈ *Page_number**grd2* : *no* ∈ *dom(private_pages)**grd3* : *no* ∉ *dom(pages)**grd5* : *selected_ais* ∈ *EDD_id* ↔ *Attr_id**grd4* : *selected_ais* = (*page_selections* ▷ {*no*}); *private_pages*; *contents*; *fields*; *attr***THEN***act1* : *pages(no)* := *private_pages(no)**act2* : *private_pages* := {*no*} ◁ *private_pages**act3* : *edd_acks_required* := *edd_acks_required* ◁ ((*selected_ais* ▷ *Acknowledge*) ∩ *edd_acks_required*)**END**

EVENT RELEASE_PAGE_OVERLAY**REFINES RELEASE_PAGE_OVERLAY****ANY**

no
selected_ais
edd_ids

WHERE

grd1 : *no* \in *Page_number*
grd2 : *no* \in *dom(private_pages)*
grd3 : *no* \in *dom(pages)*
grd6 : *contents(pages(no))* \in *Overlay_Page_contents*
grd7 : *contents(private_pages(no))* \notin *Overlay_Page_contents*
grd5 : *selected_ais* \in *EDD_id* \leftrightarrow *Attr_id*
grd4 : *selected_ais* = (*page_selections* \triangleright {*no*}); *private_pages*; *contents*; *fields*; *attr*
grd8 : *edd_ids* = *dom(page_selections* \triangleright {*no*})

THEN

act1 : *pages(no)* := *private_pages(no)*
act3 : *previous_pages(no)* := *pages(no)*
act2 : *private_pages* := {*no*} \triangleleft *private_pages*
act4 : *edd_acks_required* := *edd_acks_required* \triangleleft ((*selected_ais* \triangleright *Acknowledge*) \cap *edd_acks_required*)
act5 : *concealed_displays* := *concealed_displays* \setminus *edd_ids*

END**EVENT RELEASE_PAGES_FROM_TRQ****REFINES RELEASE_PAGES_FROM_TRQ****ANY**

ss
selected_ais
pp
pn
p_nums
edd_ids

WHERE

grd1 : *ss* \in *Page_number* \leftrightarrow *Page*
grd3 : *pp* = {*rp* | *rp* \in *Rel_Page* \wedge (*release_date(rp)* \mapsto *time_now*) \in *leq*}
grd2 : *ss* = *trq* \triangleright *pp*
grd5 : *selected_ais* \in *EDD_id* \leftrightarrow *Attr_id*
grd4 : *selected_ais* = *page_selections*; *ss*; *contents*; *fields*; *attr*
grd6 : *pn* = *dom(ss)*
grd7 : *p_nums* = *dom(((pages; contents) \triangleright *Overlay_Page_contents*) \cap ((*ss*; *contents*) \triangleright *Overlay_Page_contents*))*
grd8 : *edd_ids* = *dom(page_selections* \triangleright *p_nums*)

THEN

act1 : *pages* := *pages* \triangleleft *ss*
act3 : *previous_pages* := *previous_pages* \triangleleft (*pn* \triangleleft *pages*)
act2 : *trq* := *trq* \setminus *ss*
act4 : *edd_acks_required* := *edd_acks_required* \triangleleft ((*selected_ais* \triangleright *Acknowledge*) \cap *edd_acks_required*)
act5 : *concealed_displays* := *concealed_displays* \setminus *edd_ids*

END**EVENT DELETE_PAGE****REFINES DELETE_PAGE****ANY**

ei
no
edd_ids

WHERE

grd1 : *ei* \in *EDD_id*

```

    grd2 : no ∈ Page_number
    grd3 : ei ∈ EDITORS
    grd4 : edd_ids = dom(page_selections ▷ {no})
THEN
    act1 : pages := {no} ◁ pages
    act5 : previous_pages := {no} ◁ previous_pages
    act2 : private_pages := {no} ◁ private_pages
    act3 : trq := {no} ◁ trq
    act4 : page_selections := page_selections ▷ {no}
    act6 : edd_acks_required := dom(page_selections ▷ {no}) ◁ edd_acks_required
    act7 : concealed_displays := concealed_displays \ edd_ids
END

```

EVENT ADD_PAGE_TO_TRQ**REFINES** ADD_PAGE_TO_TRQ

```

ANY
    ei
    no
    pc
    p
WHERE
    grd1 : ei ∈ EDD_id
    grd2 : no ∈ Page_number
    grd3 : pc ∈ Page_contents
    grd4 : ei ∈ EDITORS
    grd5 : p ∈ Rel_Page
    grd6 : contents(p) = pc
    grd7 : creation_date(p) = time_now
    grd8 : (time_now ↦ release_date(p)) ∈ leq
THEN
    act1 : trq(no) := p
END

```

EVENT CLOCK**REFINES** CLOCK

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ANY
    time_next
WHERE
    grd1 : time_next ∈ Date_time
    grd2 : time_now ↦ time_next ∈ leq
    grd3 : time_next ≠ time_now
THEN
    act1 : time_now := time_next
END

```

EVENT ACKNOWLEDGE_DATA**REFINES** ACKNOWLEDGE_DATA

```

ANY
    ei
WHERE
    grd1 : ei ∈ EDD_id
    grd2 : ei ∈ dom(page_selections)
THEN
    act1 : edd_acks_required := {ei} ◁ edd_acks_required
END

```

EVENT VIEW_PAGE

REFINES VIEW_PAGE

ANY

ei

dp

ed

WHERE

grd1 : $ei \in \text{dom}(\text{page_selections})$

grd2 : $dp \in \text{Disp_params}$

grd3 : $ed \in \text{EDD_display}$

grd4 : $dp_data(dp) = \text{database}$

grd5 : $dp_page(dp) = \text{pages}(\text{page_selections}(ei))$

grd7 : $dp_time(dp) = \text{time_now}$

grd8 : $dp_acks_required(dp) = \text{edd_acks_required}\{\{ei\}\}$

grd9 : $dp_concealed(dp) = \text{bool}(ei \in \text{concealed_displays})$

grd6 : $ed = \text{disp_values}(dp)$

THEN

skip

END

EVENT TOGGLE_REVEAL_CONCEAL1

REFINES TOGGLE_REVEAL_CONCEAL1

ANY

ei

WHERE

grd11 : $ei \in \text{EDD_id}$

grd12 : $ei \in \text{concealed_displays}$

THEN

act11 : $\text{concealed_displays} := \text{concealed_displays} \setminus \{ei\}$

END

EVENT TOGGLE_REVEAL_CONCEAL2

REFINES TOGGLE_REVEAL_CONCEAL2

ANY

ei

WHERE

grd1 : $ei \in \text{EDD_id}$

grd2 : $ei \in \text{dom}(\text{page_selections})$

grd3 : $ei \notin \text{concealed_displays}$

grd4 : $\text{contents}(\text{pages}(\text{page_selections}(ei))) \in \text{Overlay_Page_contents}$

THEN

act1 : $\text{concealed_displays} := \text{concealed_displays} \cup \{ei\}$

END

END