
Especificação e Verificação de uma Câmara Fotográfica Digital

Trabalho de AMSR

*FEUP/MRSC/AMSR
MPR*

Problema a Resolver

- » Problema a concurso
 - 12th SDL Forum, 20-24 Junho 2005, Grimstad, Noruega
 - <http://ikt.hia.no/sdl05/index.html>
 - ◆ > Design Contest > Sample Design
- » Mas, adaptado a AMSR
 - Mais simples ☺
 - Especificação em Promela
 - Verificação usando o Xspin
 - ◆ Software e documentação na página de AMSR

Câmara Fotográfica Digital

- ◆ The user interface of the camera consists of
 - Trigger button
 - Flash button
 - 4 generic buttons (below the screen)
 - Screen (LCD display)
- ◆ The 4 generic buttons
 - Software-defined
 - Each button enabled individually, as needed
 - The functionality of a button may change
- ◆ Two modes of operation
 - Active Mode - photos can be taken
 - Editing Mode - photos can be viewed and deleted

Active Mode

- ◆ Buttons: Flash, Timer, Trigger, Edit
- ◆ The flash setting displayed on the Screen
 - » "Auto Flash", "No Flash", "Flash On"
 - » Default - "Auto-flash"
- ◆ The user can toggle the flash setting
 - If Auto Flash, the Flash button switches to No Flash
 - If No Flash, the Flash button switches to Flash On
 - If Flash On, the Flash button switches to Auto Flash

Active Mode

- ♦ The user can toggle the timer setting. If on, the camera will wait for the timer to expire before taking a photo
 - » If the timer is on, the Timer button disables it
 - » If the timer is off, the Timer button enables it
 - » If the timer is on, the text "Timer" appears on the screen
 - » If the timer is on and the user presses the trigger, there will be a delay. No input is allowed except for a single button, labeled Cancel, which will abort the timer

Active Mode

- ♦ The user pushes the Trigger button to take a photo. The camera-controller does the following:
 - » If the timer is on, wait until the timer expires
 - » Get the brightness value from a sensor (simulated)
 - » Set the exposure duration and flash usage
 - » Take the photo
- ♦ All buttons and the Trigger are disabled during exposure, or until the recovery time has elapsed (whichever is longer).
 - » The recovery time is one second; it allows the camera to write the photo to memory and to recharge the flash.

Active Mode

- ♦ Exposure and flash-usage calculation
 - » Brightness sensor returns: bright or dark.
 - » The exposure is short (10 ms), or long (1000 ms)
 - » Logic for choosing exposure and flash.

	Auto Flash	No Flash	Flash On
Bright	Short, no flash	Short, no flash	Short, flash
Dark	Short, flash	Long, no flash	Short, flash

Active Mode

- ♦ Memory usage
 - » Não implementar
- ♦ Assumir memória "infinita".

Edit Mode

- ♦ The user can view and edit saved pictures in Editing mode
- ♦ On the screen, display the number of the current photo and the total number
 - e.g., "4/4" for the most recent of four photos
- ♦ On entering Editing mode
 - show the most recent photo.
- ♦ Three buttons are enabled
 - Forward, Delete, Exit

Edit Mode

- ♦ The user can navigate through the photos.
- ♦ Forward button
 - » causes the next "younger" photo to be displayed.
 - » at most recent photo, Forward goes to first photo
- ♦ Delete button
 - » deletes the current photo to be deleted
- ♦ Exit button
 - » returns the camera to Active mode

Trabalho em AMSR

- » Em grupo de 2 alunos

- » O que deve ser feito
 - Especificar o sistema em Promela
 - Usando os mecanismos de verificação do XSPIN, demonstrar que:
 - ♦ o sistema é seguro (ex. a foto não é tirada antes do timer expirar)
 - ♦ o sistema projectado satisfaz todos os requisitos enunciados

- » Nota: este trabalho poderá ser substituído por um outro, proposto pelos alunos, desde que
 - Se relacione com um trabalho de mestrado, tese, ou profissional, e
 - Seja aprovado pelo professor

Trabalho

- » O que deve ser entregue
 - Um relatório (**papel + pdf**) que descreva
 - ♦ A solução proposta
 - ♦ A estratégia de verificação adoptada (ler papers recomendados)

 - Em anexo devem ser incluídos
 - ♦ A especificação do sistema em Promela
 - ♦ Os resultados de verificação obtidos
 - ♦ Os traços (sequências de eventos) relevantes