

LOG BOOK RECORD: SESSION #5

Date & Time: 3rd April 2018 9:00

General Comments:

Activity 1 - Task planning and system design changes - see
TASK_PLA _!"#\$3_%&00!00_&'A C(%)pd* .

Planned work v achieved work during session #4 was on target.

Most of the testing during session #4 was on the simulator and worked perfectly. However, when running on the hardware the LCD sometimes skipped updating the "seconds" digit and the display occasionally jumped 2 seconds at a time.

Activity 4 - System assembly and programming

Implementing "SET_TIME" mode, I found that the egg timer started running as soon as the mode was entered. I added an "egg_timer_enable" control to hold off running the egg timing until the "START KEY" or "QUICK START KEY" is pressed.

Note: "egg_timer_enable" only affects the 1 second egg timing timer, not the other system timers that run on the 10ms timer tick.

main process, main_mode = MAIN_WELCOME

	Description	Rules
Conditions	welcome_timer reaches zero	,
	Any key pressed	,
Actions	Set main_mode = MAIN_READY	,
	Set LCD_mode = LCD_SET_TIME	,
	Set LED_mode = LED_OFF	,
	Set piezo_enable = FALSE	,
	Set egg_timer_remaining = 3½ minutes	,
	egg_timer_enable = FALSE	,

main process, main_mode = MAIN_COOKING

	Description	Rules
Conditions	egg_timer_remaining reaches zero	,
	Cancel key pressed	,
Actions	Set main_mode = MAIN_DONE	,
	Set LCD_mode = LCD_DONE	,
	Set LED_mode = LED_DONE	,
	Set piezo_enable = TRUE	,
	Load egg_overcooked_timer with 30 seconds	,
	Set main_mode = MAIN_CANCELLED	,
	Set LCD_mode = LCD_CANCELLED	,
	Set LED_mode = LED_OFF	,
	Set piezo_enable = FALSE	,
	egg_timer_enable = FALSE	,

main process, main_mode = MAIN_READY

	Description	Rules									
Conditions	Minutes +1 key pressed	,									
	Minutes -1 key pressed		,								
	Seconds +10 key pressed			,							
	Seconds -10 key pressed				,						
	Start key pressed					,					
	Cancel key pressed						,				
	Quick Start key pressed							,			
Actions	Set LCD_mode = LCD_SET_TIME	,	,	,	,						
	Set LED_mode = LED_OFF	,	,	,	,						
	Set piezo_enable = FALSE	,	,	,	,						
	Set main_mode = MAIN_COOKING					,		,			
	Set LCD_mode = LCD_COOKING					,		,			
	Set LED_mode = LED_COOKING					,		,			
	Set piezo_enable = FALSE					,		,			
	Set egg_timer_remaining = 3½ minutes						,	,			
	Add 1 minute to egg_timer_remaining as long is does not exceed 6 minutes	,									
	subtract 1 minute from egg_timer_remaining as long it does not go below 2 minutes		,								
	Add 10 seconds to egg_timer_remaining as long is does not exceed 6 minutes			,							
	Subtract 10 seconds from egg_timer_remaining as long it does not go below 2 minutes				,						
	egg_timer_enable = TRUE					,		,			

main process, main_mode = MAIN_DONE										
	Description	Rules								
Conditions	Cancel key pressed	,								
	egg_overcooked_timer reaches zero	,								
Actions	Set main_mode = MAIN_CANCELLED	,								
	Set LCD_mode = LCD_CANCELLED	,								
	Set LED_mode = LED_OFF	,								
	Set piezo_enable = FALSE	,								
	Set main_mode = MAIN_OVERCOOKED	,								
	Set LCD_mode = LCD_OVERCOOKED	,								
	Set LED_mode = LED_OVERCOOKED	,								
	Set piezo_enable = FALSE	,								
	egg_timer_enable = FALSE	,								

main process, main_mode = MAIN_CANCELLED										
	Description	Rules								
Conditions	Any key pressed	,								
Actions	Set main_mode = MAIN_READY	,								
	Set LCD_mode = LCD_SET_TIME	,								
	Set LED_mode = LED_OFF	,								
	Set piezo_enable = FALSE	,								
	egg_timer_enable = FALSE	,								

The state of development at the end of this session is as follows:

Process Name	Description	Progress
LCD_task	LCD_WELCOME	Basic implementation
	LCD_SET_TIME	Complete
	LCD_COOKING	Complete
	LCD_DONE	Partial implementation
	LCD_CANCELED	Complete
	LCD_OVERCOOKED	T- D-

Process Name	Description	Progress
key_task	Debounce key presses	Complete

Process Name	Description	Progress
timer_0_ISR	System timers	Partial implementation

Process Name	Description	Progress
main	MAIN_WELCOME	Partial implementation
	MAIN_READY	Complete
	MAIN_COOKING	Complete
	MAIN_DONE	Partial implementation
	MAIN_CANCELLED	Complete
	MAIN_OVERCOOKED	T- D-

Process Name	Description	Progress
LED_task	LED_OFF	Complete
	LED_COOKING	Complete
	LED_DONE	Complete
	LED_OVERCOOKED	T- D-

Process Name	Description	Progress
timer_2_ISR	Piezo sounder drive	Complete

I also found the cause of the LCD occasionally jumping 2 seconds at a time. The calculations of minutes, tens of seconds and seconds to display used the actual egg time which could change during the calculation. I changed to software to make a local copy of the egg time first, then use this local copy to calculate minutes, tens of seconds and seconds to display. I also moved the code for the calculation, so it is only performed when necessary rather than every time round the loop.

Activity 5 - System testing and result analysis
 Test of my session #5 work in progress software:

Test #	Purpose of test	Test Data	Expected Result	Actual Result	Comments and Justification
1	Test "welcome" message	Power on Device	"welcome" message displayed	PASS	Simple welcome screen
2	Test one key 'standard' egg function	Press key for a 'standard' 3½ minute egg	Device indicates "Cooking" and starts down counting from 3:30 to 0:00. When 0:00 reached, device indicates "Done" until "Cancel" pressed by user.	PASS	Started a stopwatch at the same time as the egg timer and confirmed the accuracy of the system.
3	Test out of range timings	Try to program a cooking time below 2 minutes and above 6 minutes	The device should not allow cooking times less than 2 minutes or more than 6 minutes.	PASS	Works as expected
4	Test the 'cancel' cooking function	Select 2 minutes cooking time and press "start". Press "cancel" after a few seconds	Device indicates "Cooking" and starts down counting. When the "Cancel" key is pressed, the timer stops and displays "Canceled"	PASS	Works with normal "start" and "quickstart" modes.
5	Test invalid key press when running	Select 2 minutes cooking time and press "start". Once running, press other keys, except "cancel"	Device indicates "Cooking" and starts down counting. All key presses should be ignored. When the "cancel" key is pressed, the timer stops and displays "Cancelled"	PASS	Works with normal "start" and "quickstart" modes.

6	Test fast timing mode	Enable the fast timing mode on the device	Repeat tests 2 in fast timing mode. The only difference should be the cooking time is reduced.	4A5L	Not implemented yet
7	Test a 6 minute egg in fast timing mode	Select 6 minutes cooking time and press "start".	Device indicates "Cooking" and starts down counting from 6:00 to 0:00. When 0:00 reached, device indicates "Done" until "Cancel" pressed by user.	4A5L	Not implemented yet

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- (1) LCD jumping 2 seconds at a time found during session #4. Details of problem and solution above.
- (2) Implementing "SET TIME" revealed a flaw in the design where the egg timer started running (down counting) as soon as "SET TIME" mode entered. Solution was to add a "egg_timer_enable" control for the 1 second timer that is set to TRUE when the "START" or "QUICK START" key is pressed and set to FALSE when the time is being set - as detailed above.
- (3) Updated the simulator to use the "Combo Board" rather than individual LCD, switch banks and LED arrays to better match the hardware being used.

A2tion list *or t7e ne1t session:

- (1) Continue programming the solution as designed.
- (2) Test solution to the test plan from session 1 and add some additional tests.
- (3) Start writing operating instructions etc