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 * ECE243 Final Project: VGA Drawing Board with "Ink to Shape" Feature
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 * Description:
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 * The application is wrote in C and is designed to be run on ARM DE1-
SoC computer. The application allows user to
 * draw on VGA real-time with a PS/2 Mouse by polling 3-
byte PS/2 movement packet(2's complement mouse movement, left/right click
 * bit) from the PS/2 port on DE1-
SoC Board. The extra feature being added now is "ink to circle" which can later be exten
ded to
 * more shapes.
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 * Interface:
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 * 1) Left click - toggle draw_mode on/off (this sometimes need accurate click rate as t
he read speed from PS/2 port is 4 times/s)
 * 2) Right click - select brush colour/size
 * 3) Brush Colour - located at the top left of the VGA display
 * 4) Brush Size - locatied below the brush colour
 * 5) "Ink to Circle" - the green button on the right of the brush size
 * 6) KEY[3-0] - Reset cursor and clear the canvas
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 * An Example Showing How to Use:
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 * 1) Open and compile the code on CPULATOR: https://cpulator.01xz.net/?sys=arm-de1soc
 * 2) Click on the small drop-
down menu on the top left of the PS/2 Keyboard or Mouse panel and select "Mouse" in "Mod
e"
 * 3) Run the compiled code and locatae one of the two PS/2 Keyboard or Mouse panels on
the left
 * 4) If want to move mouse click "start" and move slowly (otherwise may cause 64-
byte FIFO overflow), click "Esc" to pause
 * 5) click left button once to toggle into "draw mode" and click one more time to switc
h back
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 * Note: if it's not working properly, exit capture mode and use "send packet 3-
byte" to send left/right click signal
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 * 6) Draw something using different brushes! (Use right click for selecting)
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 * 7) After done drawing click "ink-to-
circle" button (green) - this only supports when there is only a single enclosed contour
 * on the VGA display
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 * 8) click any KEY[3-0] to reset
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 * Troubleshooting:
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 * 1) if get "CPU tried writing to address ..." error afte right click on "ink-to-
circle" button, that means it's reading right
 * click multiple times  - use "send packet - 3-
byte" in "PS/2 Keyboard or Mouse" panel as your right click
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