Assembly Project: Tetris

Daniel Du

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1 Instruction and Summary

1. Which milestones were implemented? Milestones 1-5:

   Easy features:

   - 1. Gravity implemented
   - 2. Gravity speed increases every 2 rows
   - 4. Sound effects for rotating ('w'), dropping ('s'), clearing lines
   - 5. Pause the game
   - 7. Start with 5 unfinished rows
   - 12. Each tetromino is a different colour

   Hard features:

   - 2. Implement the full set of tetrominoes.

2. How to view the game:

   Display grid:

   - Unit width in pixels: 8
   - Unit height in pixels: 8
   - Display width in pixels: 256
   - Display height in pixels: 256
   - Base Address for Display: 0x10008000

   The actual game grid itself is 13x30.

   Immutable data will contain:

   (a) Address of bitmap display

   (b) Keyboard address

   (c) Various colours and a colour palette

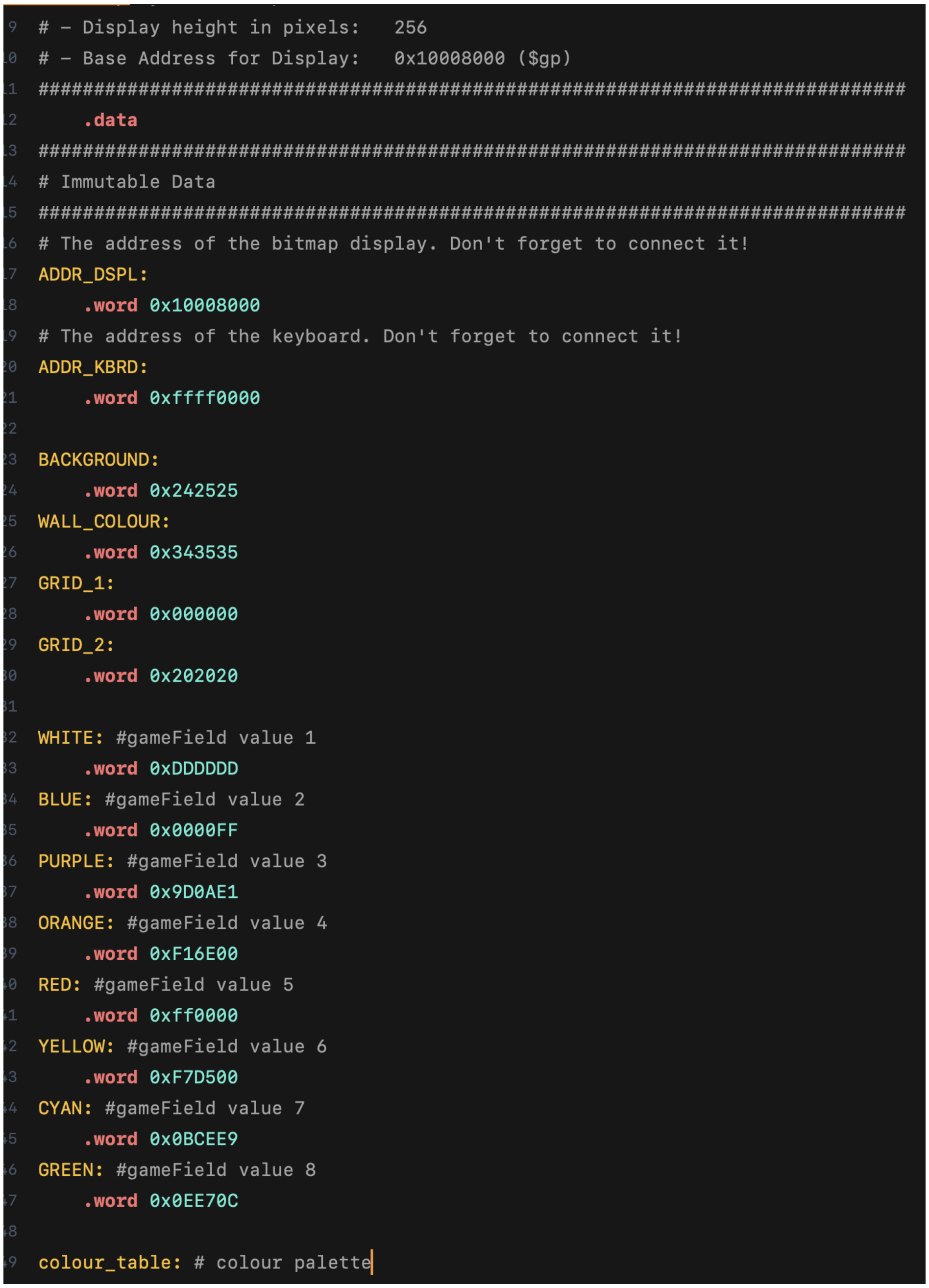
   Mutable data will contain:

   (a) A gameField to store what colours to store

   (b) The x and y values to insert the tetromino at

   (c) The tetromino's rotation state

   (d) Temporary storage of the tetromino's block coordinates.



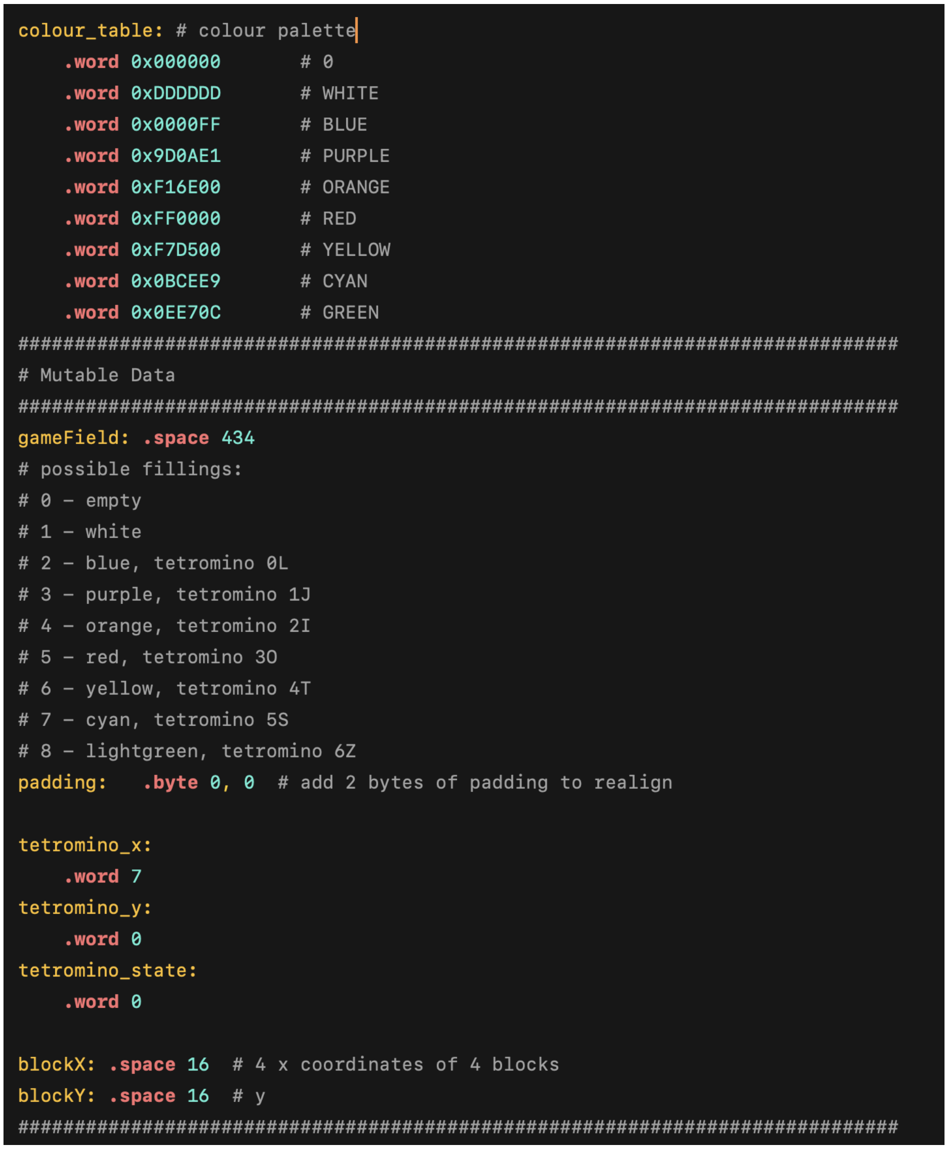
```
# - Display height in pixels:   256
# - Base Address for Display:   0x10008000 ($gp)
##############################################################################
    .data
##############################################################################
# Immutable Data
##############################################################################
# The address of the bitmap display. Don't forget to connect it!
ADDR_DSPL:
    .word 0x10008000
# The address of the keyboard. Don't forget to connect it!
ADDR_KBRD:
    .word 0xffff0000

BACKGROUND:
    .word 0x242525
WALL_COLOUR:
    .word 0x343535
GRID_1:
    .word 0x000000
GRID_2:
    .word 0x202020

WHITE: #gameField value 1
    .word 0xDDDDDD
BLUE: #gameField value 2
    .word 0x0000FF
PURPLE: #gameField value 3
    .word 0x9D0AE1
ORANGE: #gameField value 4
    .word 0xF16E00
RED: #gameField value 5
    .word 0xff0000
YELLOW: #gameField value 6
    .word 0xF7D500
CYAN: #gameField value 7
    .word 0x0BCEE9
GREEN: #gameField value 8
    .word 0x0EE70C

colour_table: # colour palette
```

Figure 1: Memory (immutable)



```
colour_table: # colour palette
    .word 0x000000       # 0
    .word 0xDDDDDD       # WHITE
    .word 0x0000FF       # BLUE
    .word 0x9D0AE1       # PURPLE
    .word 0xF16E00       # ORANGE
    .word 0xFF0000       # RED
    .word 0xF7D500       # YELLOW
    .word 0x0BCEE9       # CYAN
    .word 0x0EE70C       # GREEN
##############################################################################
# Mutable Data
##############################################################################
gameField: .space 434
# possible fillings:
# 0 - empty
# 1 - white
# 2 - blue, tetromino 0L
# 3 - purple, tetromino 1J
# 4 - orange, tetromino 2I
# 5 - red, tetromino 3O
# 6 - yellow, tetromino 4T
# 7 - cyan, tetromino 5S
# 8 - lightgreen, tetromino 6Z
padding:   .byte 0, 0  # add 2 bytes of padding to realign

tetromino_x:
    .word 7
tetromino_y:
    .word 0
tetromino_state:
    .word 0

blockX: .space 16  # 4 x coordinates of 4 blocks
blockY: .space 16  # y
##############################################################################
```

Figure 2: Memory (mutable)

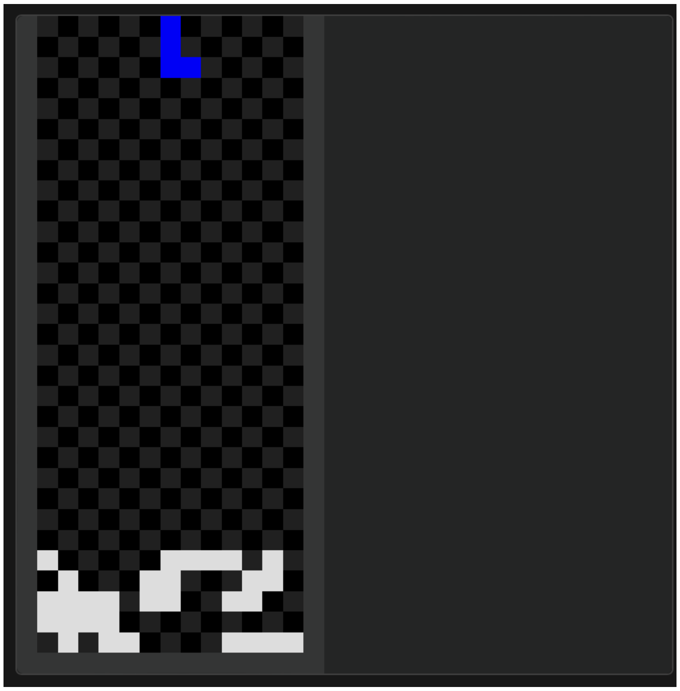


Figure 3: Game grid

3. Game Summary: Fill in the coloured rows to clear them. Try and clear as many rows as possible; the blocks will drop faster as you clear more rows.
    - Press on the grid to start playing!
    - Press ”w” to rotate the tetromino
    - Press ”a” to go left
    - Press ”d” to go right
    - Press ”s” to drop the tetromino
    - Press ”p” to pause
    - Press ”q” to quit