DESIGN MILESTONE

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DATATYPE DESIGN

- Login screen
  - Textbox that allows the user to pick a username
  - Buttons that allow user to choose between using an IP address or localhost
  - Users can select a whiteboard from a dropdown list or create a new white-board
- Righthand-side panel provides tools that allows client-end control
  - Buttons that allow clients to choose between drawing and erasing
  - A pallet that holds all of Color's colors. The pallet is clickable by changing the color of the buttons
  - A slider that changes the stroke-size
  - A list that shows the usernames of collaborators
- Whiteboard-specific artsy meter in a panel at the bottom of the screen. We will implement an a algorithm to determine teh artsyness of the board
- The rest of the window is the canvas
- Classes
  - Artist class (Package: client). This class allows the client to enter a username, IP/localhost, and select or create a whiteboard.
  - Canvas class (Package: client). The GUI of the whiteboard client-end white-board. This class implements the above features and passes messages to the server.
  - Whiteboard class (Package: server). This stores the whiteboard information on the server and passes the information to a new client when they connect. Information is stored in a hashmap that allows quick lookup and mutation.

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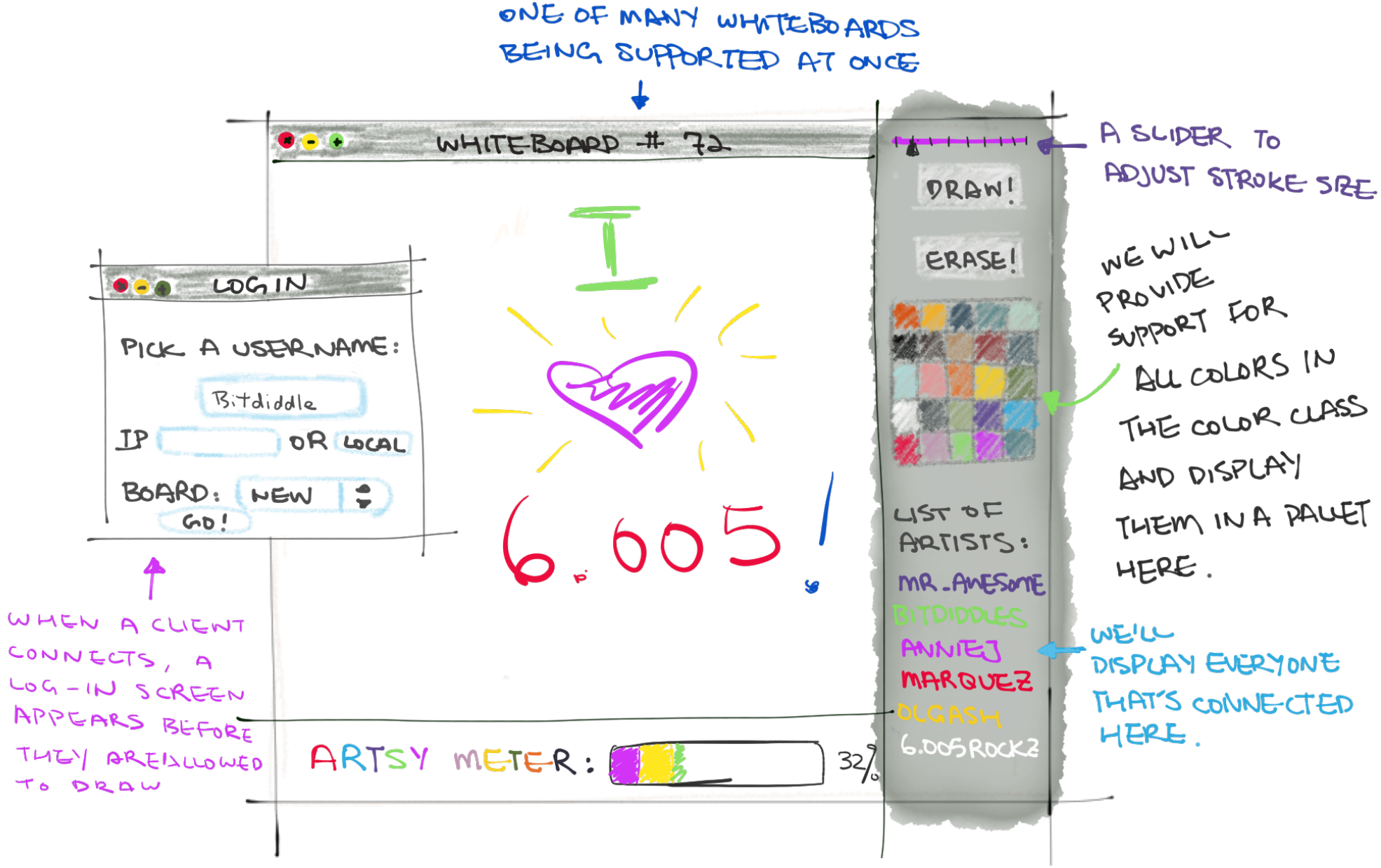
DATATYPE DESIGN [CONTINUED]

    * Every whiteboard has a list of its attributes
    * Background color --> also changes the eraser color
- WhiteboardServer class (Package: server)
    * The server keeps track of the list of Whiteboard objects, creates new Whiteboards, and communicates to clients

METHODS


ONE OF MANY WHITEBOARDS BEING SUPPORTED AT ONCE
WHITEBOARD # 72
A SLIDER TO ADJUST STROKE SIZE
DRAW!
ERASE!
WE WILL PROVIDE SUPPORT FOR ALL COLORS IN THE COLOR CLASS AND DISPLAY THEM IN A PALLET HERE.
LOGIN
PICK A USERNAME:
Bitdiddle
IP OR LOCAL
BOARD: NEW
GO!
6.005!
LIST OF ARTISTS:
MR_AWESOME
BITDIDDLES
ANNIEJ
MARQUEZ
OLGASH
6.005ROCKS
WE'LL DISPLAY EVERYONE THAT'S CONNECTED HERE.
WHEN A CLIENT CONNECTS, A LOG-IN SCREEN APPEARS BEFORE THEY ARE ALLOWED TO DRAW
ARTSY METER:
32%

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PROTOCOL

- Server - > Client
  - a list of whiteboard names and ids (WB_ID WB_NAME WB_ID WB_NAME...)
  - lines of commands for previous whiteboard state, separated by newlines ("USERS" USER_NAME USER_NAME... "PIXELS" X1 Y1 COLOR_R1 COLOR_G1 COLOR_B1 X2 Y2 COLOR_R2 COLOR_G2 COLOR_B2...)
  - new draw actions to everyone connected to a particular whiteboard ("DRAW" ARTSY_METER STROKE X Y COLOR_R COLOR_G COLOR_B)
  - new client joins ("NEWUSER" USER_NAME) to all but new client
  - change background color ("BG" COLOR_R COLOR_G COLOR_B)
  - a client leaves ("BYEUSER" USER_NAME)

- Client- > Server
  - initial connect message (to create new Person object), request whiteboard names ("HELLO")
  - select whiteboard (add user to the whiteboard, set user name, return whiteboard state) ("SELECT" WB_ID USER_NAME)
  - make new whiteboard (with color, name), like selecting, but new ("NEW" WB_NAME COLOR_R COLOR_G COLOR_B USER_ID USER_NAME)
  - new draw actions ("DRAW" WB_ID STROKE X Y COLOR_R COLOR_G COLOR_B)
  - change whiteboard bg color ("BG" WB_ID COLOR_R COLOR_G COLOR_B)
  - disconnect message ("BYE" WB_ID USER_NAME)

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CONCURRENCY STRATEGY

- During a mouse drag event, packets of pixels and their color is sent to the server and the server modifies the Whiteboard's hashmap to reflect the changes of pixel colors.
- The hashmap is synchronized for concurrency
- The method setColor is also synchronized for concurrency
- ID numbers for users and whiteboards will use AtomicIntegers as incrementing counters
- Whiteboards are treated independently and do not share information
- Each user keeps track of their stroke history. The log in screen and whiteboard GUIs do not share objects, but the user ID and username is shared in message passing
- No shared objects; only messages passed in final sockets
- Client has a blocking queue that processes the server messages relating to the drawing/erasing of other users on the same whiteboard; incoming and outgoing messages are on separate threads
- Only call UI repaint in Swingutilities.invokeLater()

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TESTING STRATEGY

- Practice drawing to make sure that the UI works as planned
- Receiving and sending commands both using local host and IP address
- Test multiple users sharing one whiteboard and multiple whiteboard support
- Concurrency testing
  - Make sure behavior is as expected when one user draws and another user erases common pixels
  - Multiple users drawing over common pixels
  - Strokes' real time behavior combined with erasing
  - Two strokes of different colors intersect, same result is synced across different clients
  - Acceptable lag time
- Check to see that whiteboard state is saved during disconnect/reconnect

ERROR HANDLING

- Placeholder