

## Max 6 (also known as Max/MSP/Jitter)

### **User Interface Basics:**

#### **- Command+N: File/New Patcher**

- A Max file is called a patcher
- A network of objects connected by patch cords within a patcher is called a patch
  
- **View menu:** Show or hide different UI elements
- **Toolbar:** bottom of Max window
- **Max 6 Toolbar (Max 6 demo installed in Media Arts Lab):**
  - **Lock/Unlock:** Make your patch editable or non editable
  - **Patcher Windows:**
    - **Show Object Explorer:** Open window to choose from all available objects
    - **Show Key Commands**
    - **Presentation Mode:** Display your patch
    - **Inspector:** Edit attributes
    - **Enable Debugging:** Troubleshoot errors in your patcher
    - **Show/Hide Grid**
    - **Mixer:** Show/hide mini mixer for patchers with audio objects
    - **Show/Hide Status Bar**
    - **Open/Close Sidebar**
      - Explorer Settings, View By Icon, View By Name, Show/Hide Object Details, Create Selected Object, Help, Reference
- **Max 5 Toolbar (Max 5 installed in Sound Lab):**
  - **Lock/Unlock:** Make your patch editable or non editable
  - **New Object:** Create new object
  - **Zoom:** Zoom in or out of patch
  - **Presentation Mode:** Display your patch
  - **Inspector:** Edit attributes
  - **Bring Forward/Send Backwards:** Move your objects forward or backwards on Z axis
  - **Show/Hide Grid**
  - **Enable/Disable Snap to Grid**
  
- Objects are grouped by category in **Sidebar/Explorer:**
  - All, UI Objects, Max, MSP, Jitter, Reference
- Objects can be scaled horizontally (drag in bottom right corner of object) and moved within patcher window
- Cut, Copy and Paste can be used to create multiple instances of objects
- Objects have inlets and outlets which are indicated by little black boxes on the top/bottom of the object
  - Inlets/outlets can be connected by patch cords by clicking and dragging from one to another
  - Click on arrow halfway down patch cord/Align to automatically align patch cords
    - Drag double arrows up/down to modify patch cord routing
  
- **Shift+Command+H: Right click on an object/Open Help or Help/Open Help**
  - Help files are standalone patchers that demonstrate how an object works
  - **Help/Max/MSP/Jitter Tutorials** are also a great resource

- Use See Also for related object help files
- **Shift+Command+R: Right click on an object/Open Reference or Help/Open Reference**
  - Description, Arguments, Messages, Attributes, Menu Items, Output, Examples, See Also
- **Toolbar/Show Key Commands:**
  - **B:** Button
  - **C:** Comment
  - **F:** Float number box
  - **I:** Number box
  - **J:** Jitter object
  - **L:** Live object
  - **M:** Message box
  - **N:** New object
  - **P:** Show Explorer
  - **Shift+P:** Presentation Object
  - **T:** Toggle

### Basic UI Objects:

- **button:** Blink and send a bang
  - Provides visual feedback of an action and is used to trigger other messages and processes
  - Click to send bang
  - Any message or number triggers bang output
- **toggle:** Switch between off and on (0/1)
  - Sends a 0 as output when turned off and 1 when turned on
  - When giving input, a non-zero number will turn it on, a 0 will turn it off and a bang will alternate the state of the toggle
- **message:** Send any message
  - Displays and sends any given message with the capacity to handle specified arguments
- **number:** Display and output a number
  - Displays, inputs and outputs integer numbers
- **flonum:** Display and output a floating point number
  - Displays, inputs and outputs floating point numbers
- **object:** A new Max object
  - Select and input object name to bring up:
    - Text Completion, Name Matches, Descriptions and Tags
- **slider:** Move a slider to output values
  - Resembles a sliding potentiometer (dimmer switch), outputting numbers restricted to a specified range, offset by a specified number and multiplied by a specified number
  - Range can be set in Inspector or Max window

### Other Important Objects:

- **metro:** Output a bang message at regular intervals
  - Interval (number) argument specifies time in milliseconds; send number to right inlet to specify
  - Send a bang to the left inlet to start/stop
- **print:** Print any message in the max window
  - Prints any input into the Max window for debugging, messaging or analysis purposes

- **Command+M: Window/Max Window** (also available in Sidebar)
- **Math Objects:**
  - **+**: Add two numbers and output the result
  - **-**: Subtract two numbers and output the result
  - **\***: Multiply two numbers together and output the result upon receiving input in the left inlet
  - **/**: Divide two numbers (according to the specified divisor assignment) and output result
  - **Comparison Objects:** Output 1 if true, 0 if false
    - **>**: Greater than
    - **>=**: Greater than or equal to
    - **==**: Equal
    - **!=**: Not equal
    - **<=**: Less than or equal to
    - **<**: Less than
  - **random:** Generate a random number
    - Outputs random numbers within the range between 0 and 1 less than the argument specified
    - Bang left inlet to get random number
    - Set range via right inlet
- **imovie:** Play a movie in a user-interface object within the patcher window
  - **Messages for imovie Object:**
    - **border \$1:** Draw a border around the movie display area
    - **read:** Load movie file with optional filename argument
      - Must be in same directory as patcher
    - **gettime:** Send the current movie time out the object's left outlet
  - **Transport Controls:**
    - **number:** Set current time location (Quicktime units)
    - **start:** Start playback
    - **stop:** Stop playback
    - **pause:** Pause playback
    - **resume:** Resume playback
    - **next:** Move ahead number of Quicktime units
  - **Speed and Time:**
    - **rate 0:** Play at default speed
    - **rate 1:** Stop playback
    - **rate 1 2:** Two numbers specify a fractional playback rate
    - **rate -1.5:** Play in reverse at faster speed
    - **length:** Send movie length out the object's left outlet
    - **time:** Send current movie time out the object's left outlet
  - **Looping:**
    - **loop \$1:** Turn looping on/off
    - **loopstart:** Set the loop start (default 0)
    - **loopend:** Set the loop end (default is end of movie)
    - **loopset:** set both start and end
    - **palindrome \$1:** Set the looping mode (normal or palindrome)
- **makenote:** Generate a note-on/note-off pair
  - Outputs a MIDI note-on message paired with a velocity value followed by a note-off message after a specified amount of time. This allows for generative MIDI output without having to manage note-off generation

- **kslider:** Output numbers from an onscreen keyboard
  - Connect outlet with inlet of makenote to send MIDI notes
- number sent to left inlet sets pitch and starts a note
  - 0 is lowest note, 127 is highest note
- number sent to middle inlet sets velocity (volume)
  - 0 is silent, 127 is maximum velocity
- number sent to right inlet sets note duration in milliseconds
- **clear:** Cancel future note-offs
- **stop:** Send all note-offs out now
- **Arguments (optional):** velocity, duration, channel
- Left outlet sends pitch MIDI number
- Right outlet sends velocity of currently playing note
- **noteout:** Transmit MIDI note messages to a MIDI device
  - Double click to see available MIDI ports:
    - **AU DLS Synth 1:** Play notes using Max's built in MIDI device
    - **IAC Driver Bus 1:** Send notes to other MIDI application (Garageband, Logic, etc)
      - See notes on enabling IAC Driver
  - Left inlet can receive MIDI note on/off messages or from makenote
  - Middle inlet receives note velocity (volume)
  - Right inlet receives note channel