

Scripting the Unscriptable

GUI Scripts in AppleScript

Sonoma update

Wednesday, November 15

Circa macOS 14.1

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www.sudoade.com



What is GUI scripting?

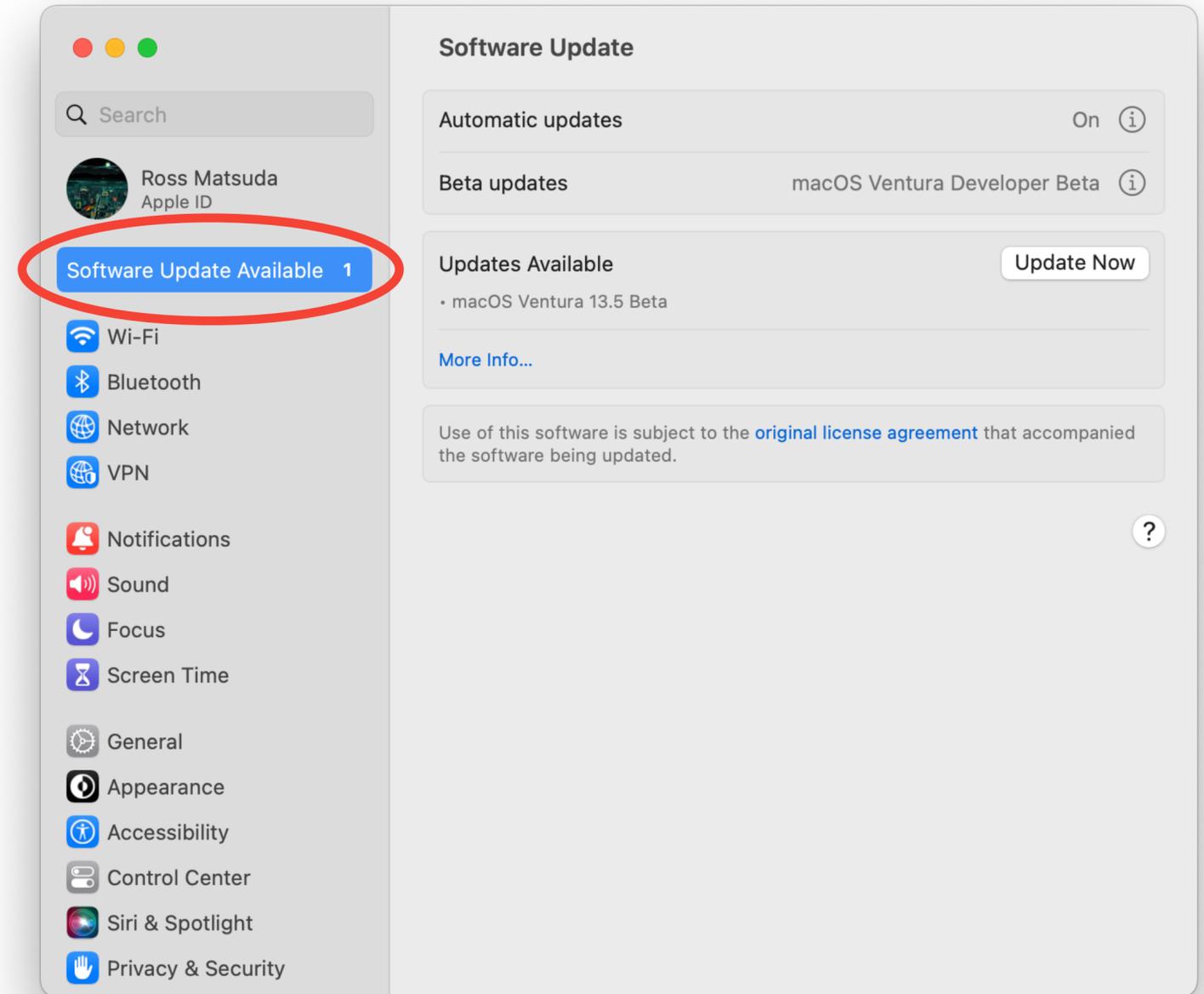
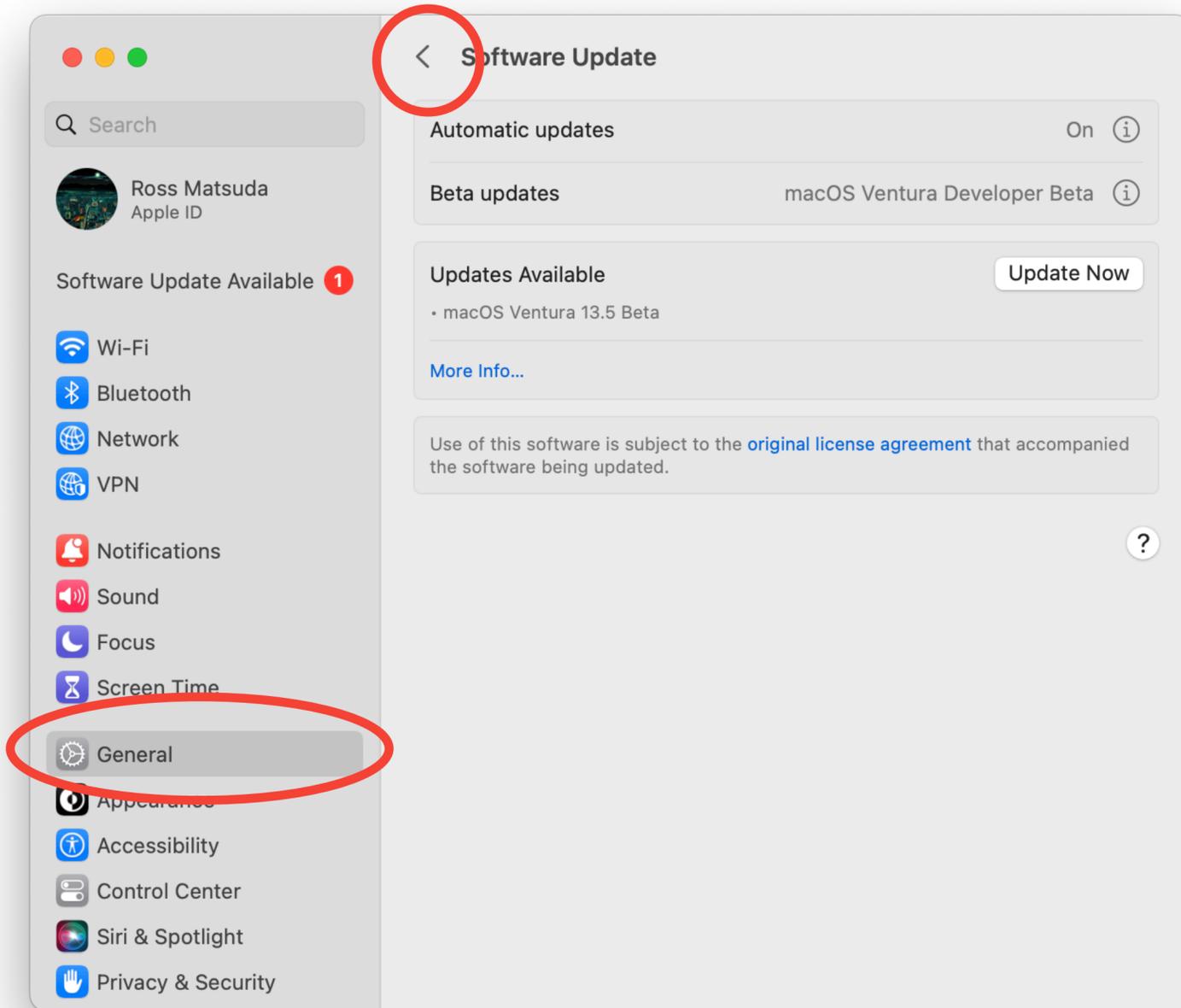
- Simulating user action and input
- Handled in AppleScript
- A terrible idea



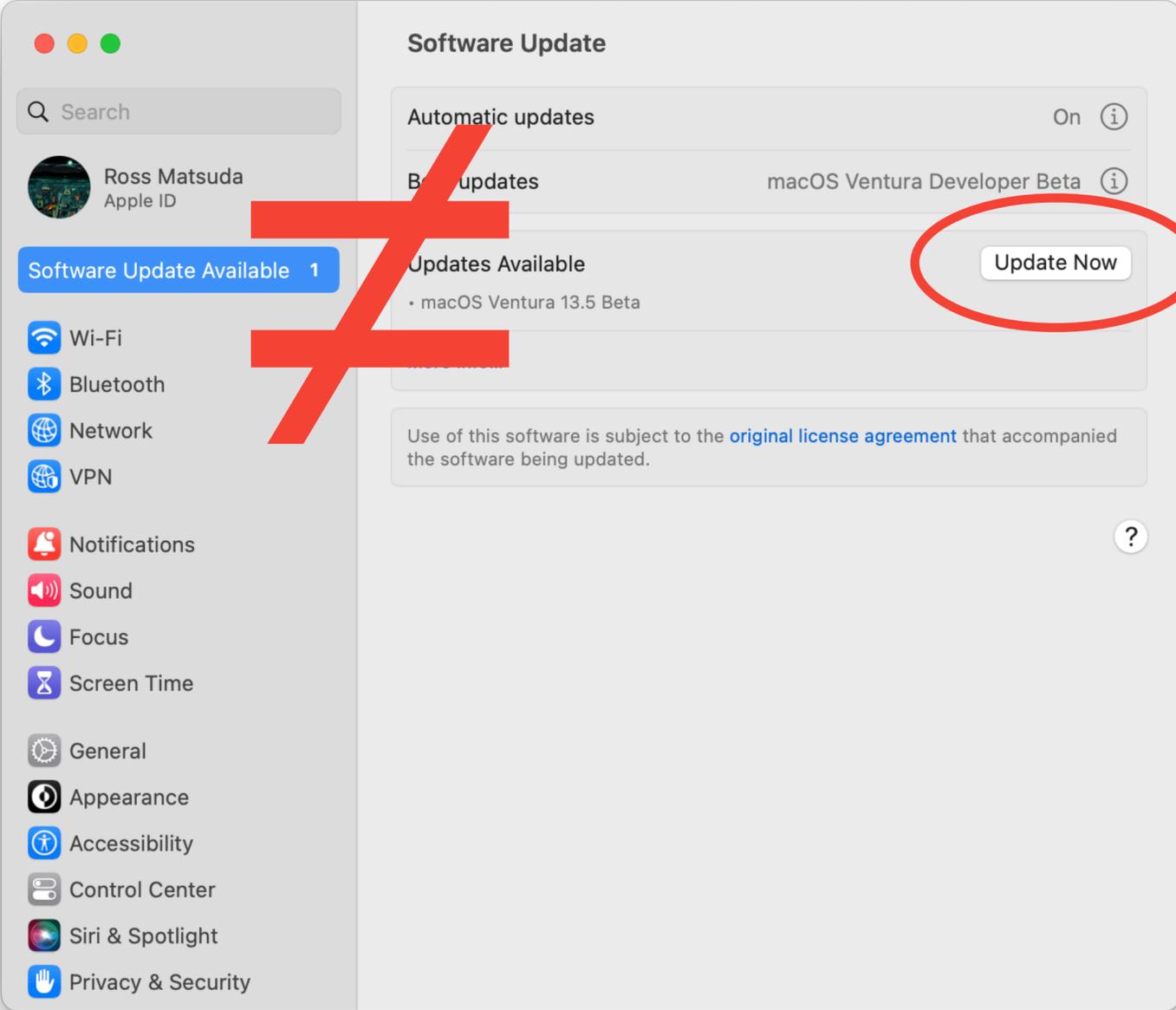
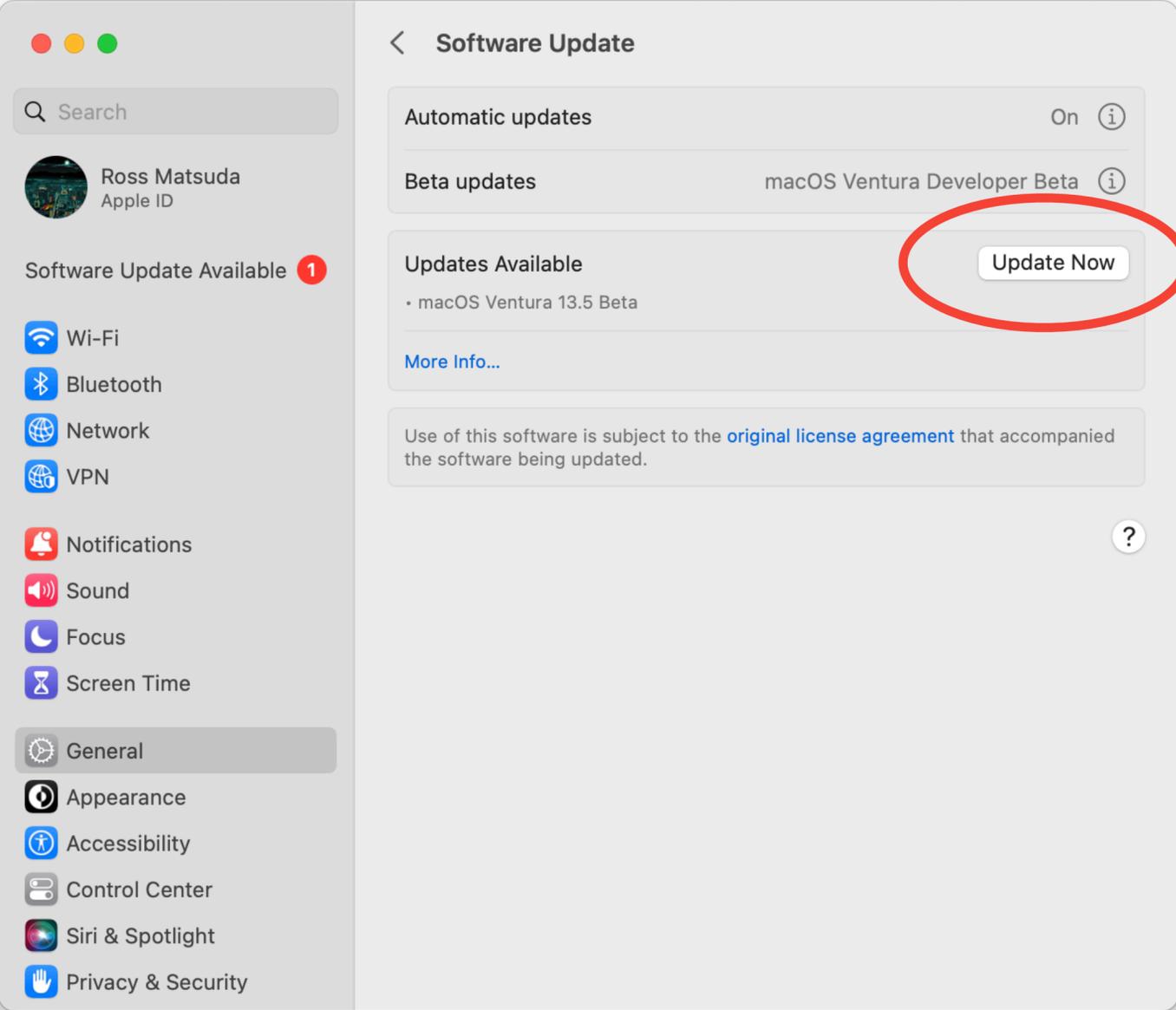
What is GUI scripting?

- Timing-specific
- OS-specific
- Software version-specific
- Specific-specific

SCRIPTING THE UNSCRIPTABLE



SCRIPTING THE UNSCRIPTABLE

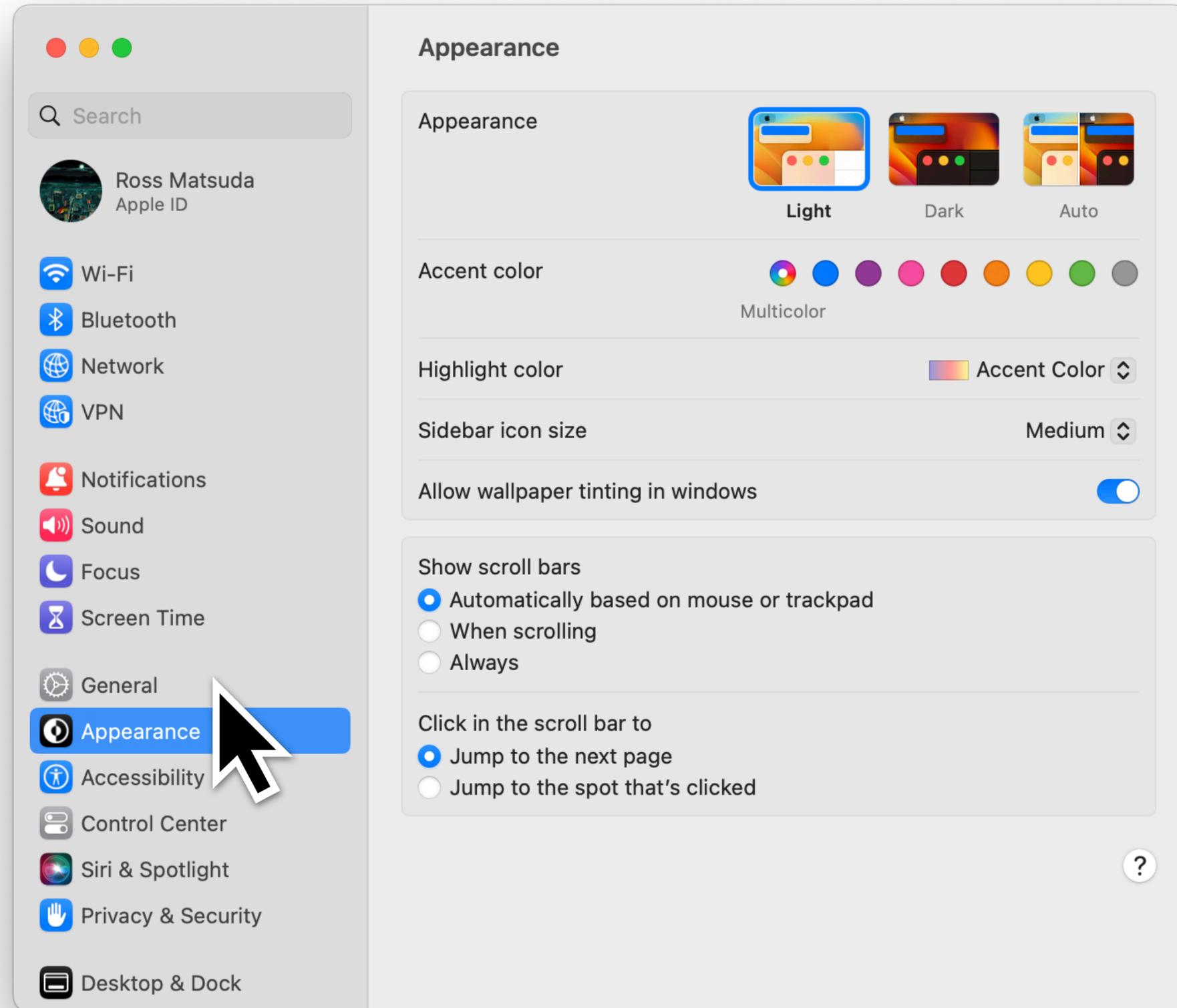


1 - Set your workflow

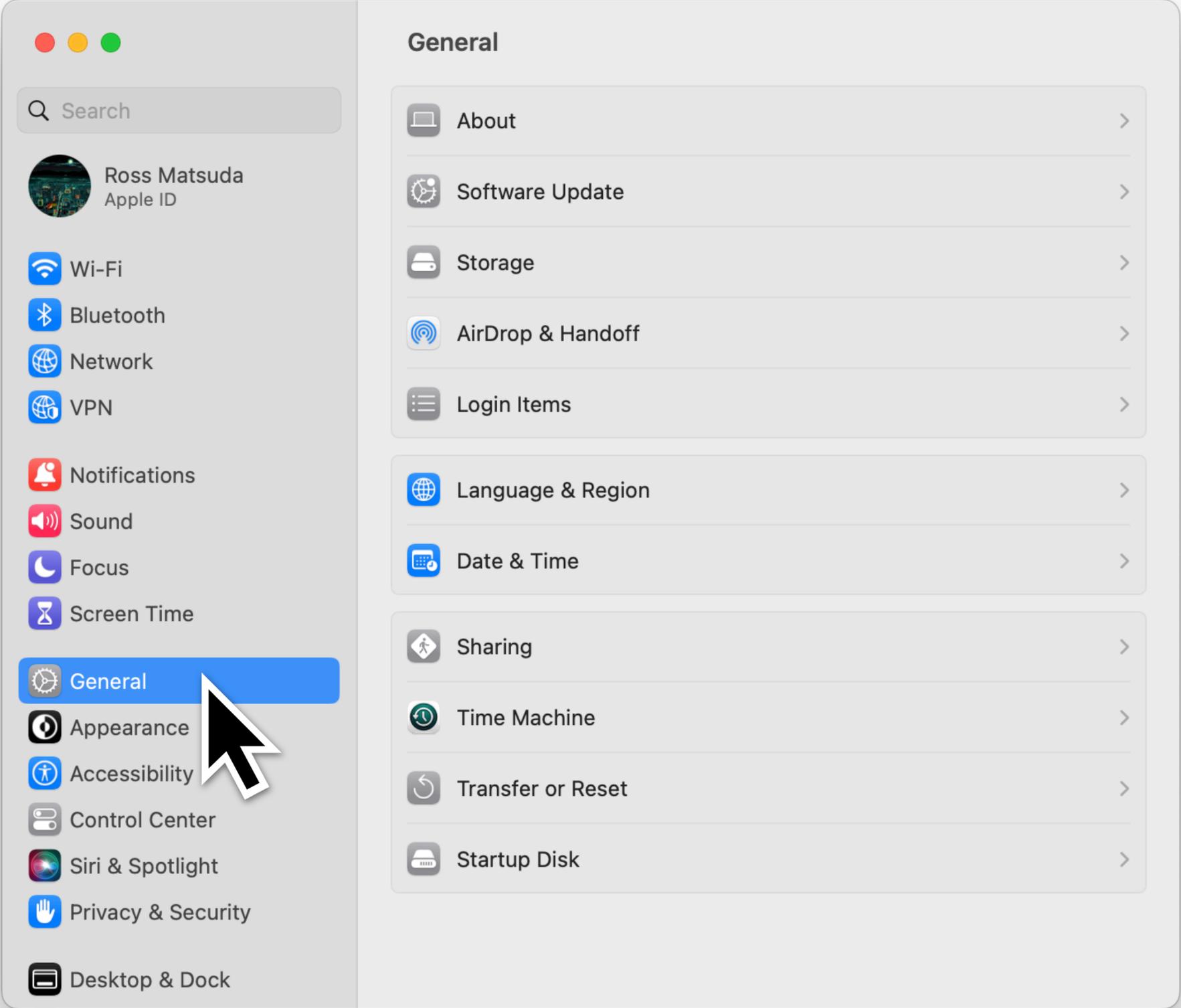
For today's nonsense, let's look at clicking the "More Info" button in System Settings, Software Update



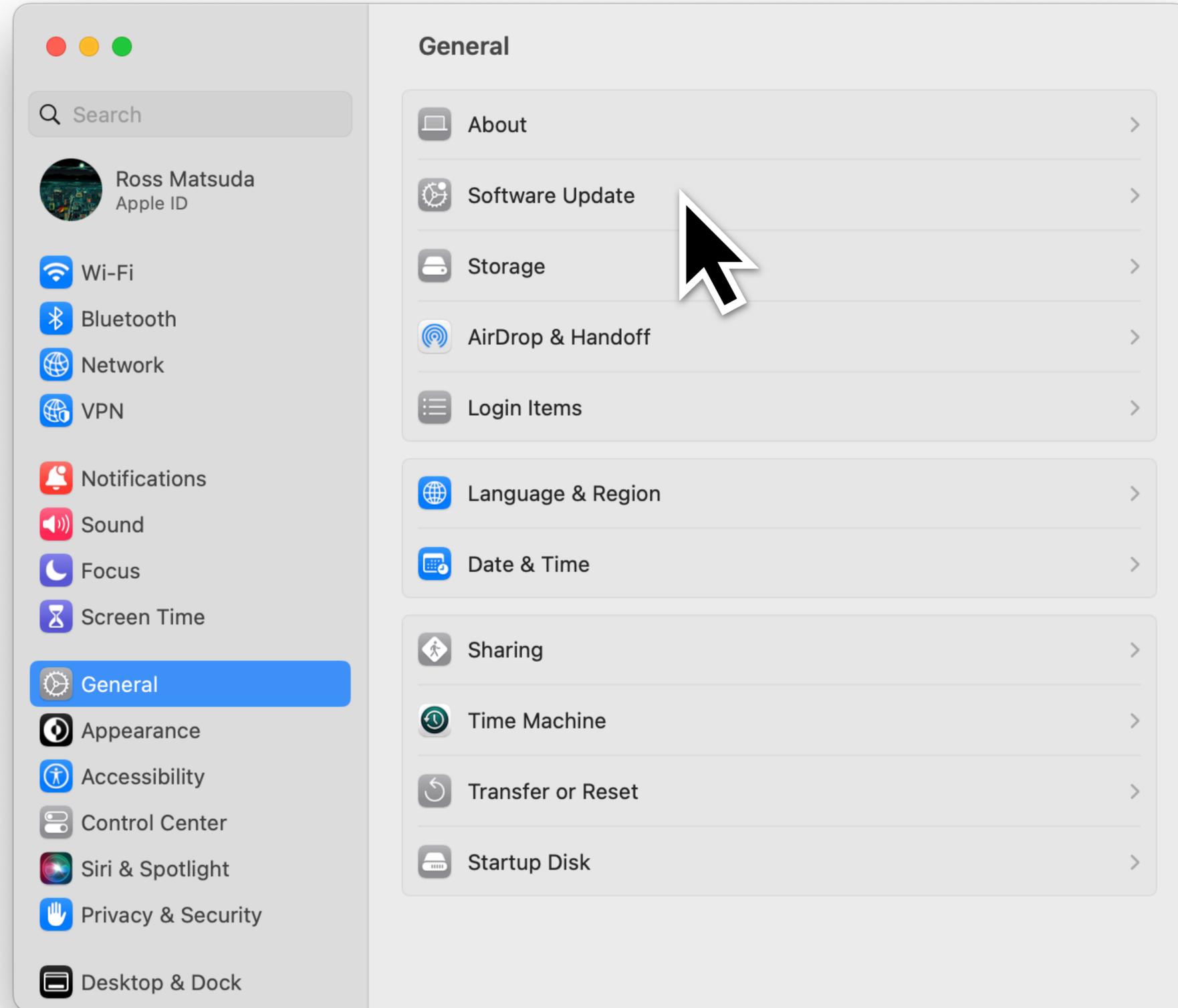
SCRIPTING THE UNSCRIPTABLE



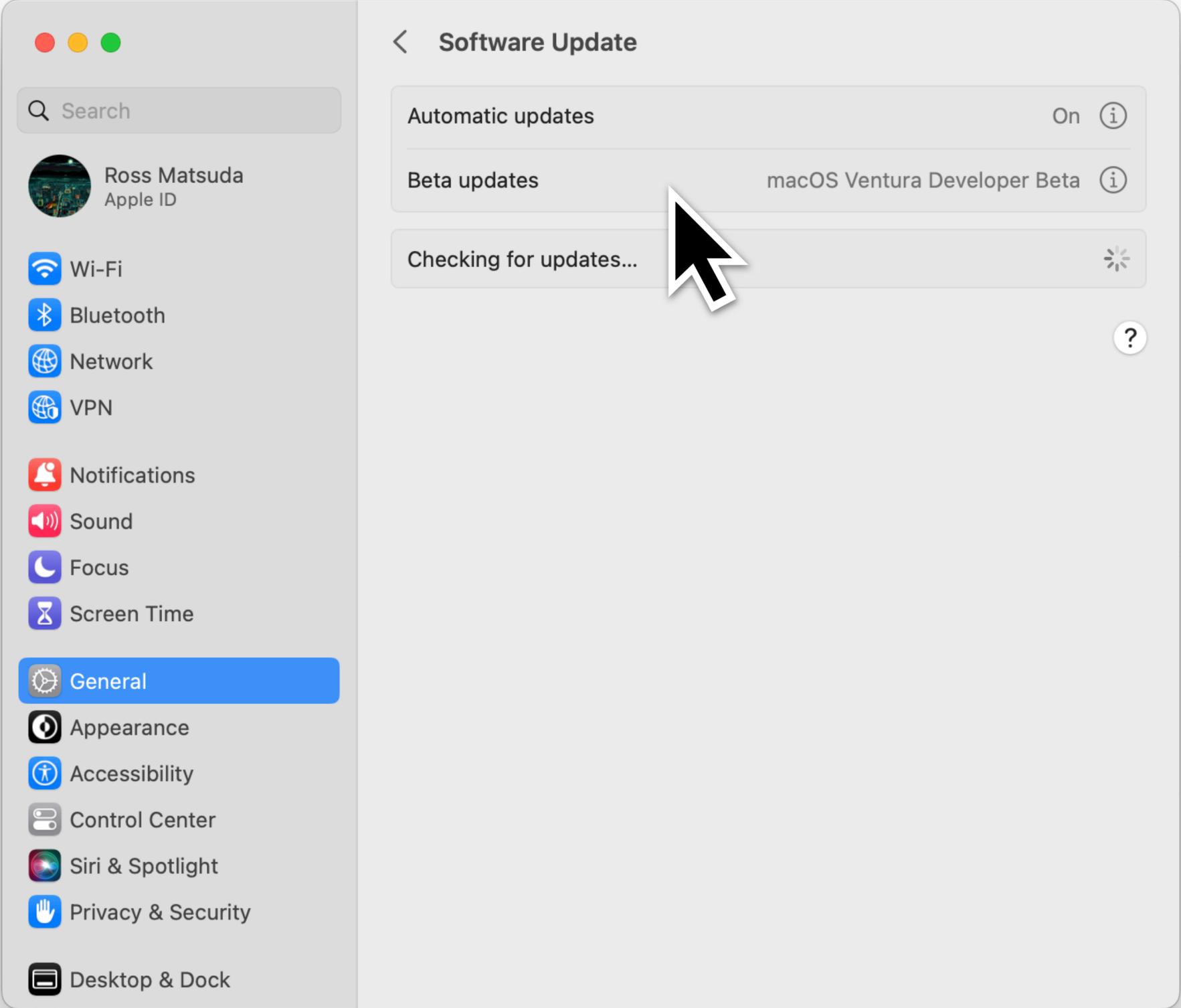
SCRIPTING THE UNSCRIPTABLE



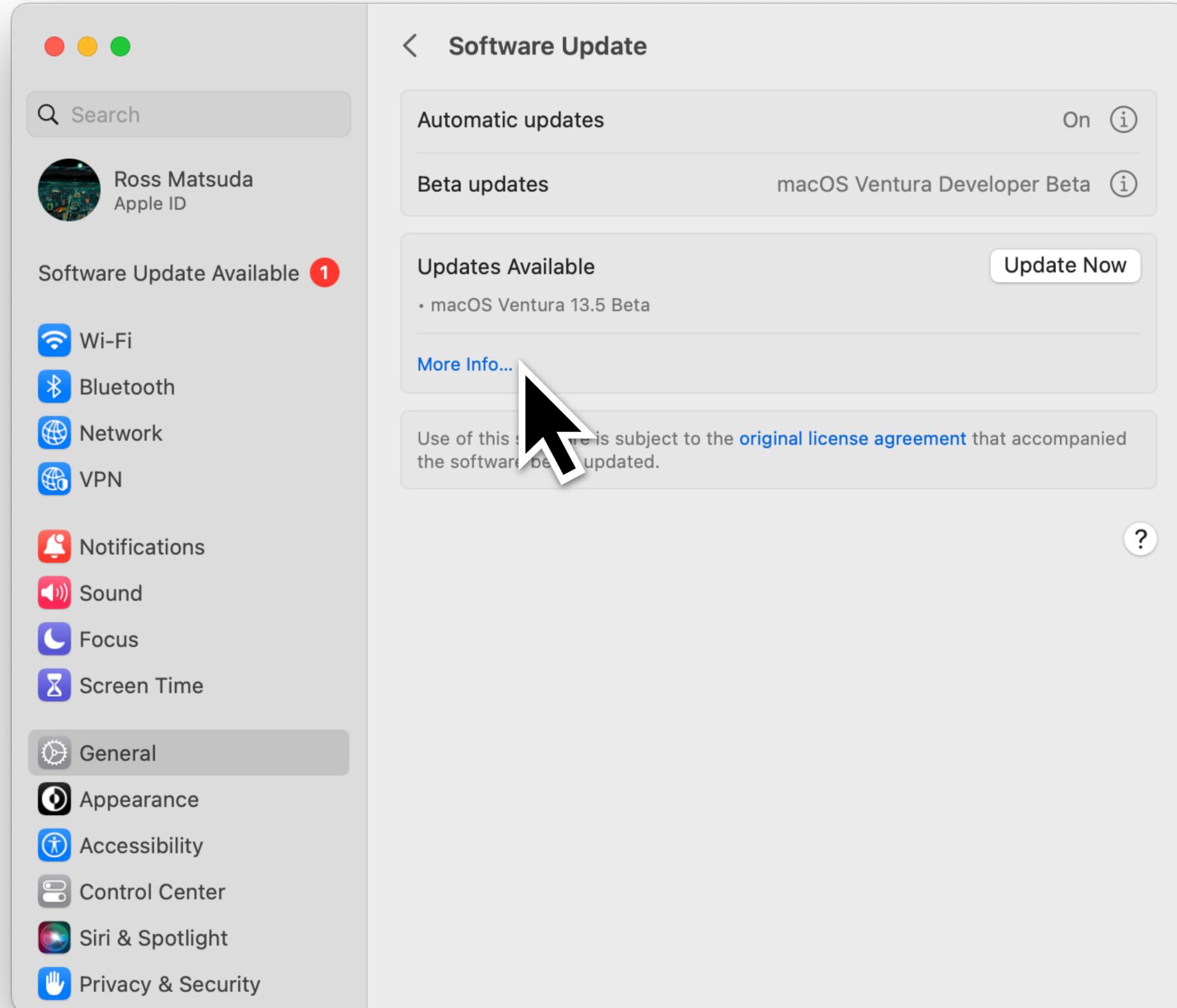
SCRIPTING THE UNSCRIPTABLE

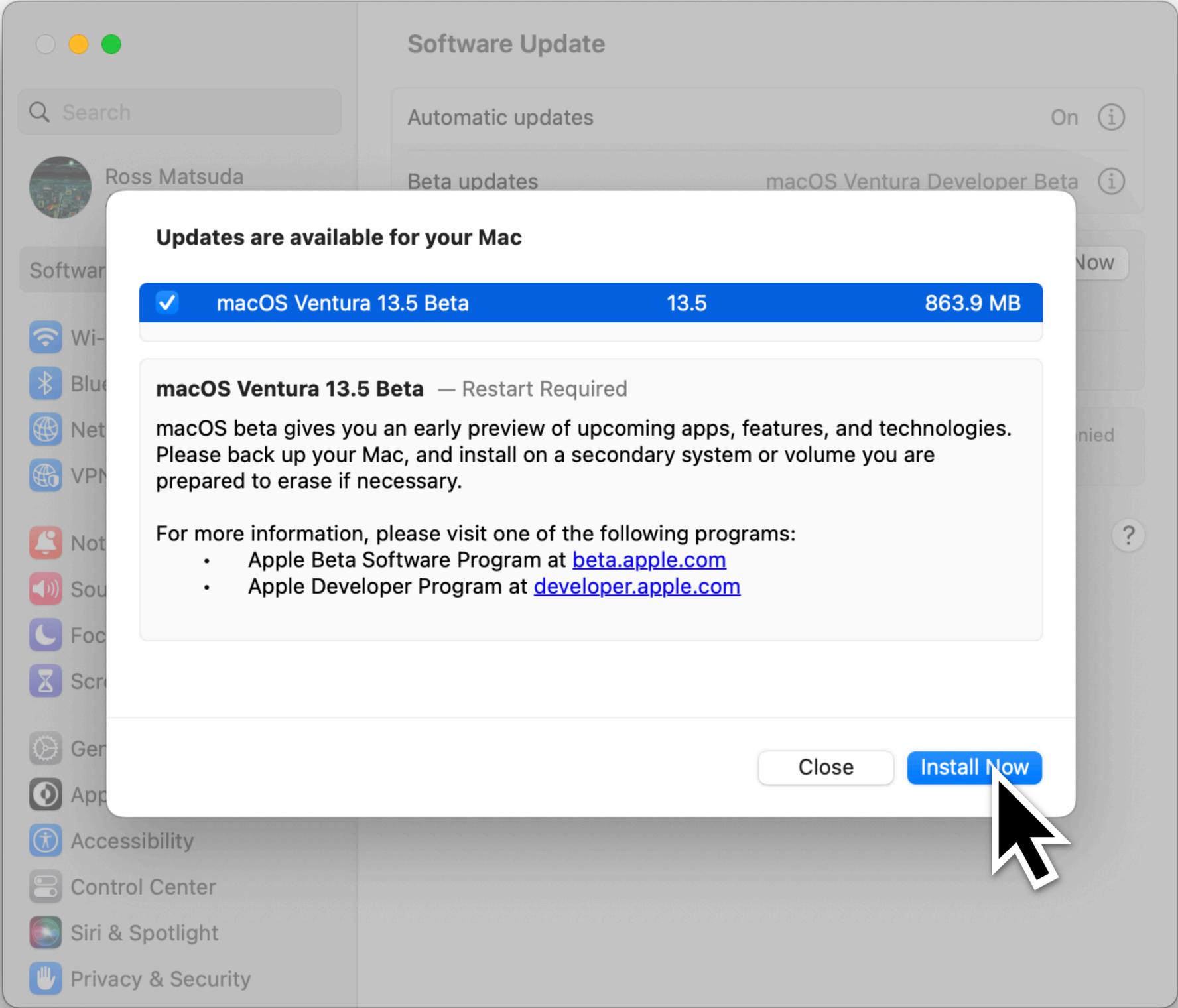


SCRIPTING THE UNSCRIPTABLE



SCRIPTING THE UNSCRIPTABLE





Regarding the "More Info" target in macOS 13+

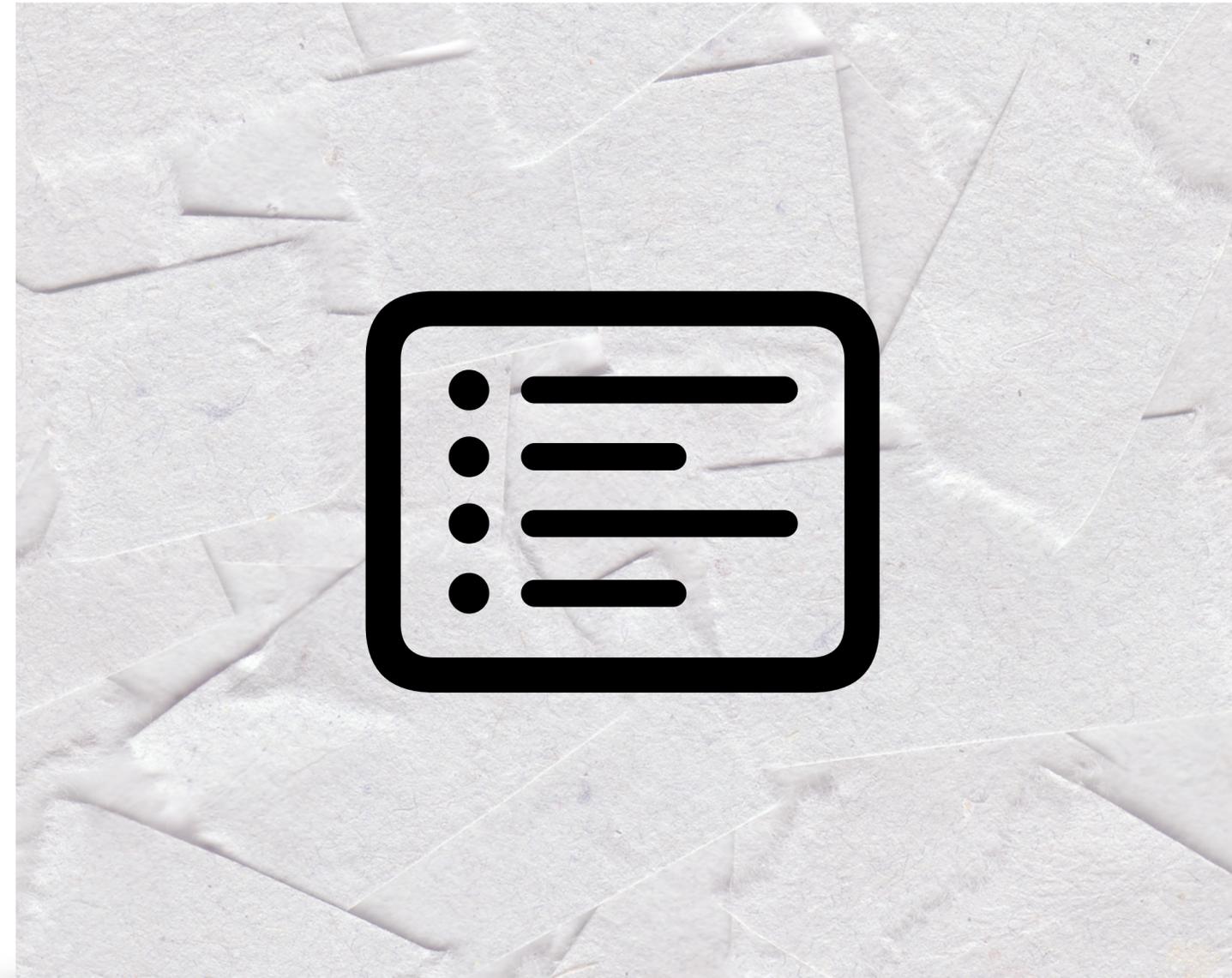
FB13256531

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2 - Define element names

Start from the first step you can't handle with CLI

- Open System Settings/ Preferences
- Click on General
- Click on Software Update



2 - Define element names

Start from the first step you

`open x-apple.systempreferences:`

`com.apple.Software-Update-Settings.extension`

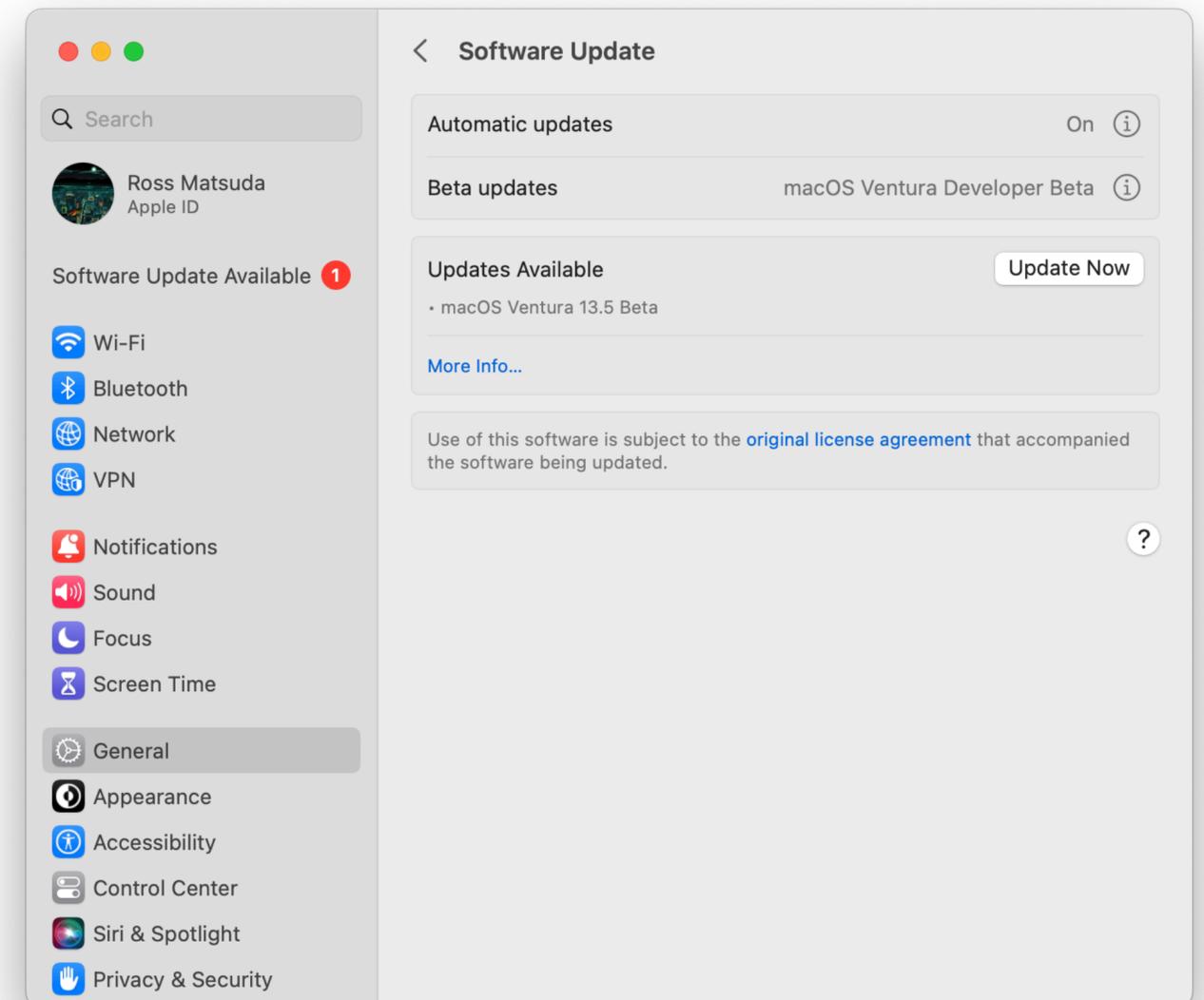
- Open System Preferences
- Click on General
- Click on Software Update



2 - Define element names

```
tell application "System Events"  
  tell front window of process "System Settings"  
    set uiElems to entire contents  
  end tell  
end tell
```

- Customize the second line to change targets





Untitled
Edited



AppleScript ▾ <No selected element> ▾

```
tell application "System Events"  
  tell front window of process "System Settings"  
    set uiElems to entire contents  
  end tell  
end tell
```

Result

```
{group 1 of window "Appearance" of application process "System Settings" of application "System Events",  
splitter group 1 of group 1 of window "Appearance" of application process "System Settings" of application  
"System Events", group 1 of splitter group 1 of group 1 of window "Appearance" of application process "System  
Settings" of application "System Events", text field 1 of group 1 of splitter group 1 of group 1 of window  
"Appearance" of application process "System Settings" of application "System Events", button 1 of text field 1  
of group 1 of splitter group 1 of group 1 of window "Appearance" of application process "System Settings" of  
application "System Events", scroll area 1 of group 1 of splitter group 1 of group 1 of window "Appearance" of  
application process "System Settings" of application "System Events", outline 1 of scroll area 1 of group 1 of  
splitter group 1 of group 1 of window "Appearance" of application process "System Settings" of application  
"System Events", row 1 of outline 1 of scroll area 1 of group 1 of splitter group 1 of group 1 of window  
"Appearance" of application process "System Settings" of application "System Events", UI element 1 of row 1 of
```

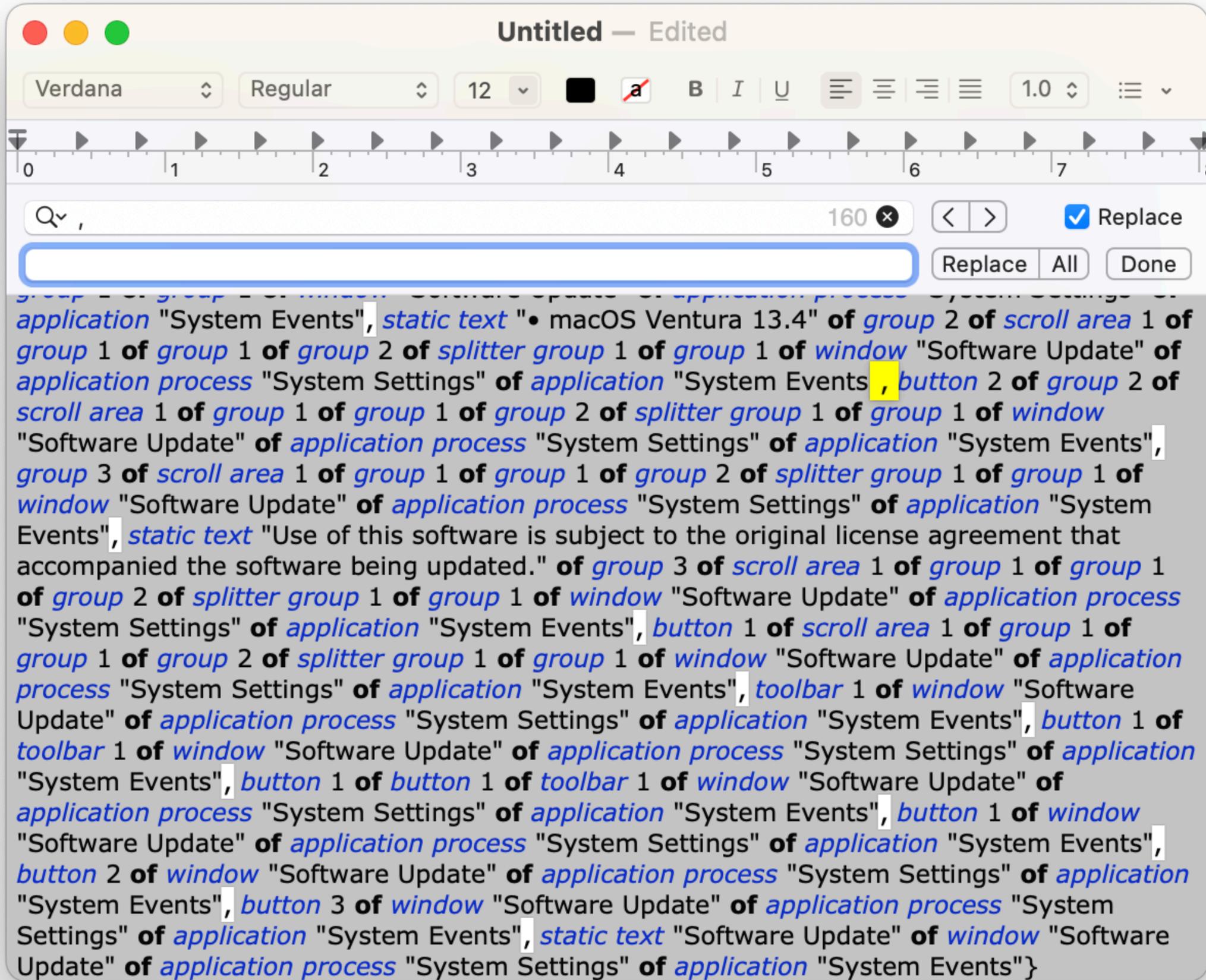


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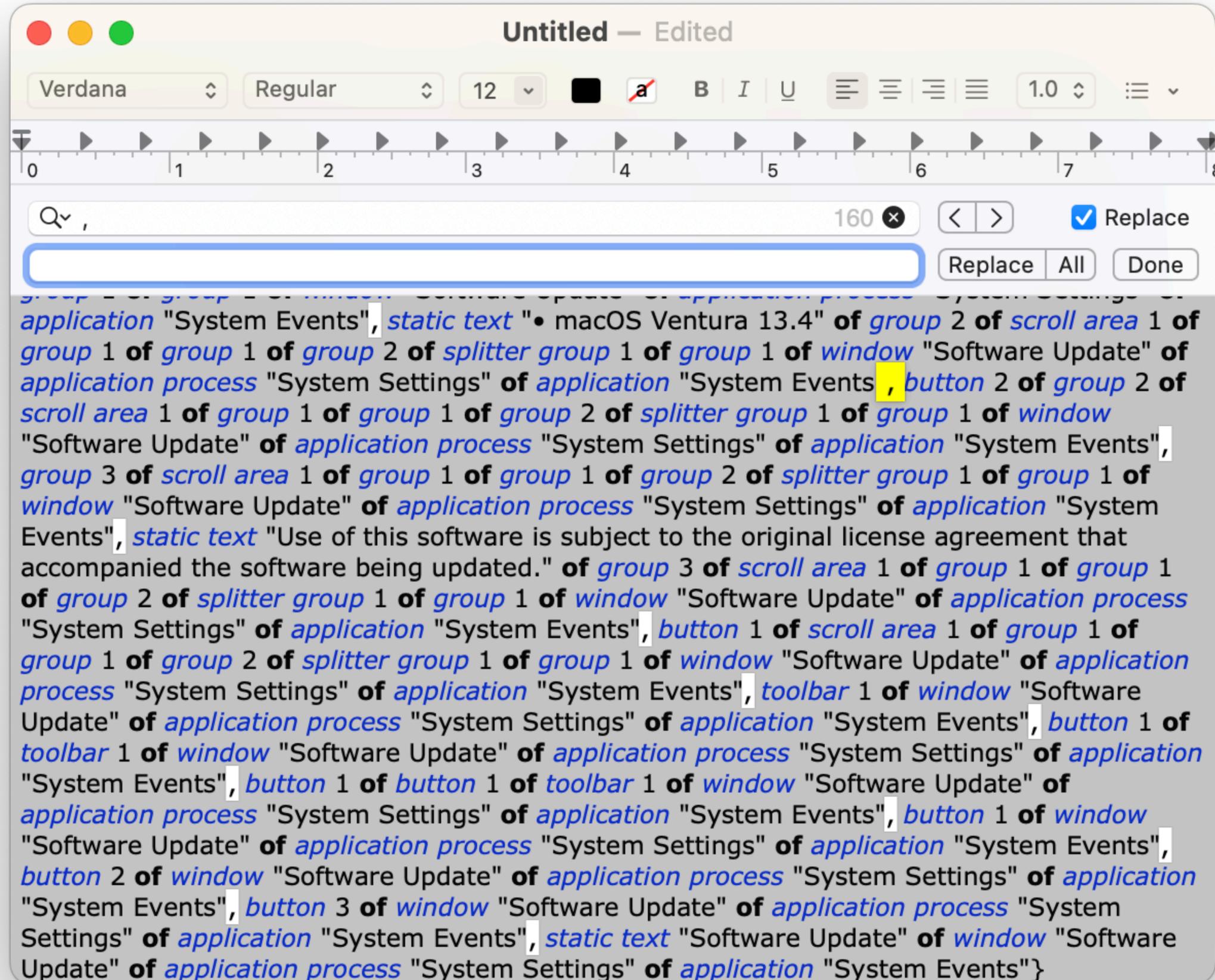
0 1 2 3 4 5 6 7 8

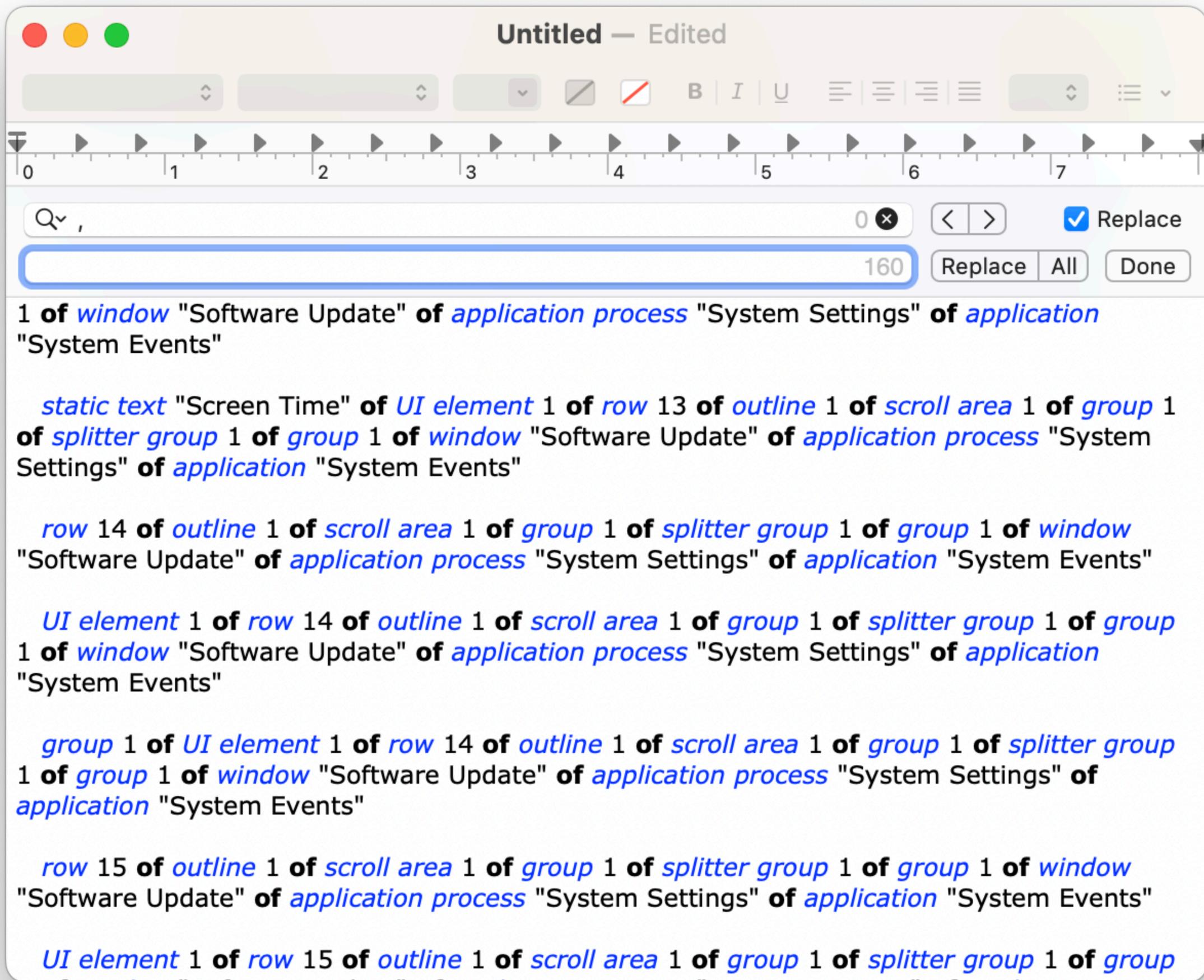
```
{group 1 of window "Software Update" of application process "System Settings" of application "System Events", splitter group 1 of group 1 of window "Software Update" of application process "System Settings" of application "System Events", group 1 of splitter group 1 of group 1 of window "Software Update" of application process "System Settings" of application "System Events", text field 1 of group 1 of splitter group 1 of group 1 of window "Software Update" of application process "System Settings" of application "System Events", button 1 of text field 1 of group 1 of splitter group 1 of group 1 of window "Software Update" of application process "System Settings" of application "System Events", scroll area 1 of group 1 of splitter group 1 of group 1 of window "Software Update" of application process "System Settings" of application "System Events", outline 1 of scroll area 1 of group 1 of splitter group 1 of group 1 of window "Software Update" of application process "System Settings" of application "System Events", row 1 of outline 1 of scroll area 1 of group 1 of splitter group 1 of group 1 of window "Software Update" of application process "System Settings" of application "System Events", UI element 1 of row 1 of outline 1 of scroll area 1 of group 1 of splitter group 1 of group 1 of window "Software Update" of application process "System Settings" of application "System Events", group 1 of UI element 1 of row 1 of outline 1 of scroll area 1 of group 1 of splitter group 1 of group 1 of window "Software Update" of application process "System Settings" of application "System Events", row 2 of outline 1 of scroll area 1 of group 1 of splitter group 1 of group 1 of window "Software Update" of application process "System Settings" of application "System Events", UI element 1 of row 2 of outline 1 of scroll area 1 of group 1 of splitter group 1 of group 1 of window "Software Update" of application process "System Settings" of application "System Events", static text "Sign in, with your Apple ID" of UI element 1 of row 2 of outline 1 of scroll area 1 of group 1 of splitter group 1 of group 1 of window "Software Update" of application process "System Settings" of application "System Events", row 3 of outline 1 of scroll area 1 of group 1 of splitter group 1 of group 1 of window "Software Update" of application process "System
```



CARRIAGE RETURN

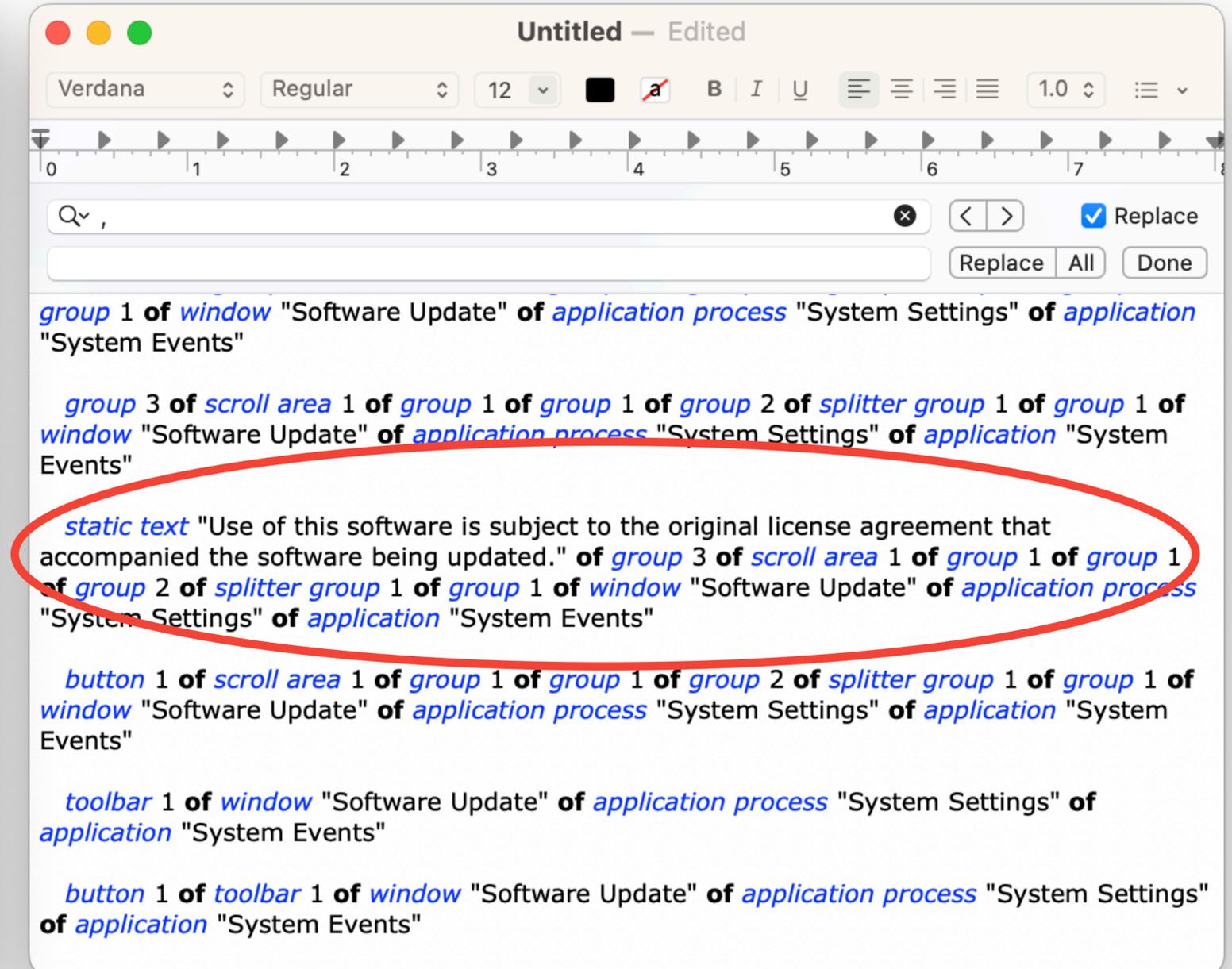
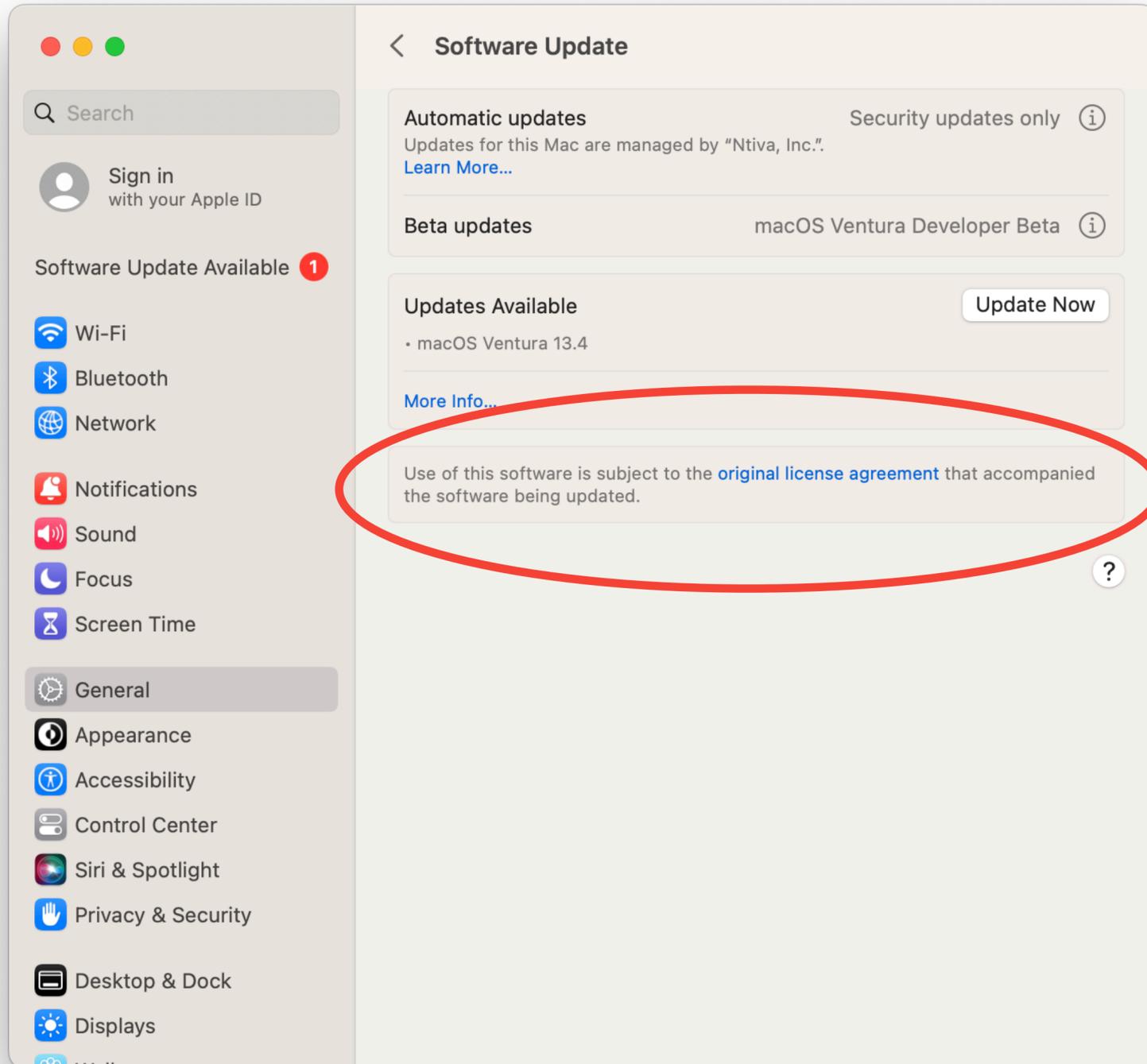
\-return



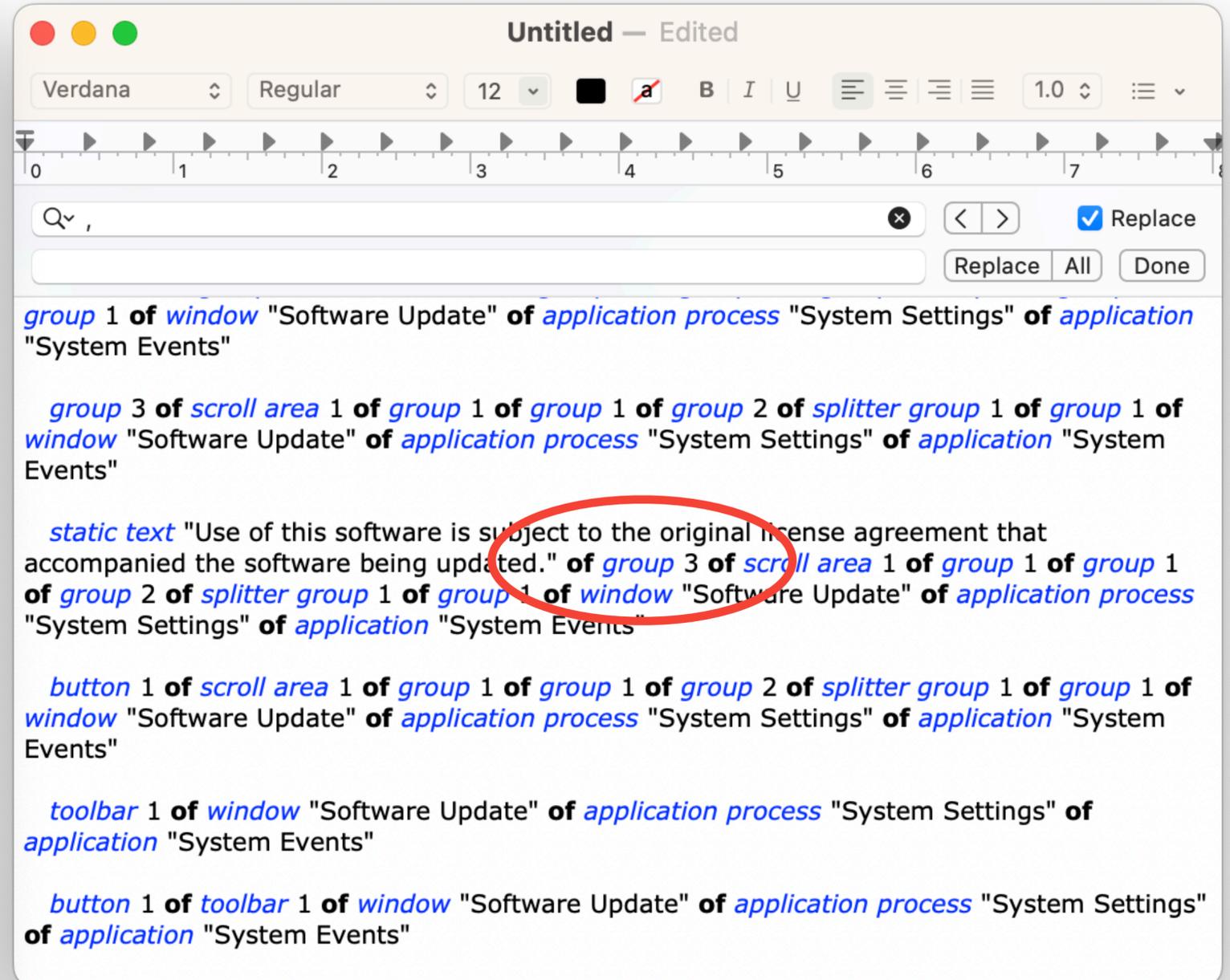
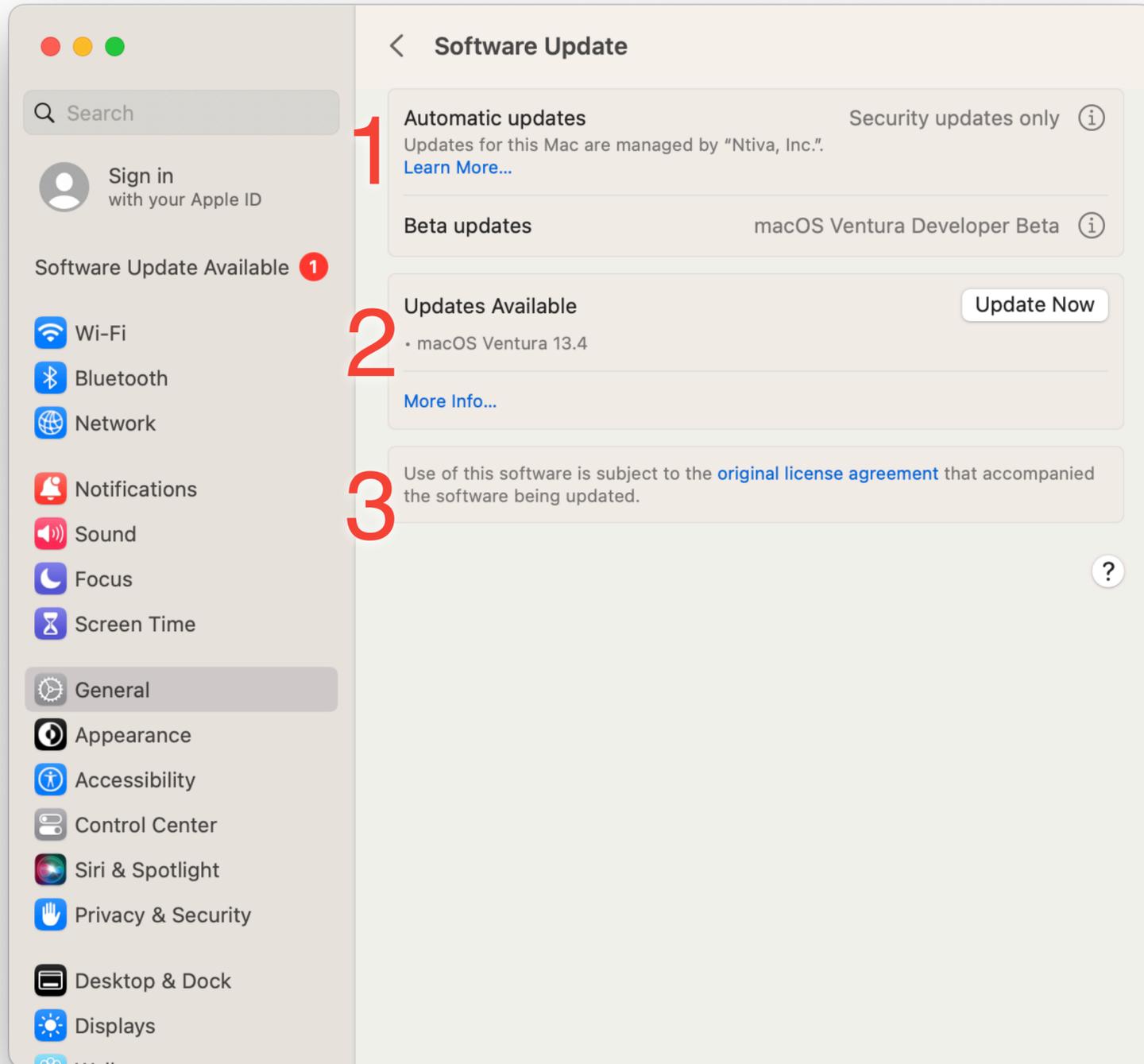


static text "Use of this software is subject to the original license agreement that accompanied the software being updated." **of** *group 3 of scroll area 1 of group 1 of group 1 of group 2 of splitter group 1 of group 1 of window* "Software Update" **of** *application process* "System Settings" **of** *application* "System Events"

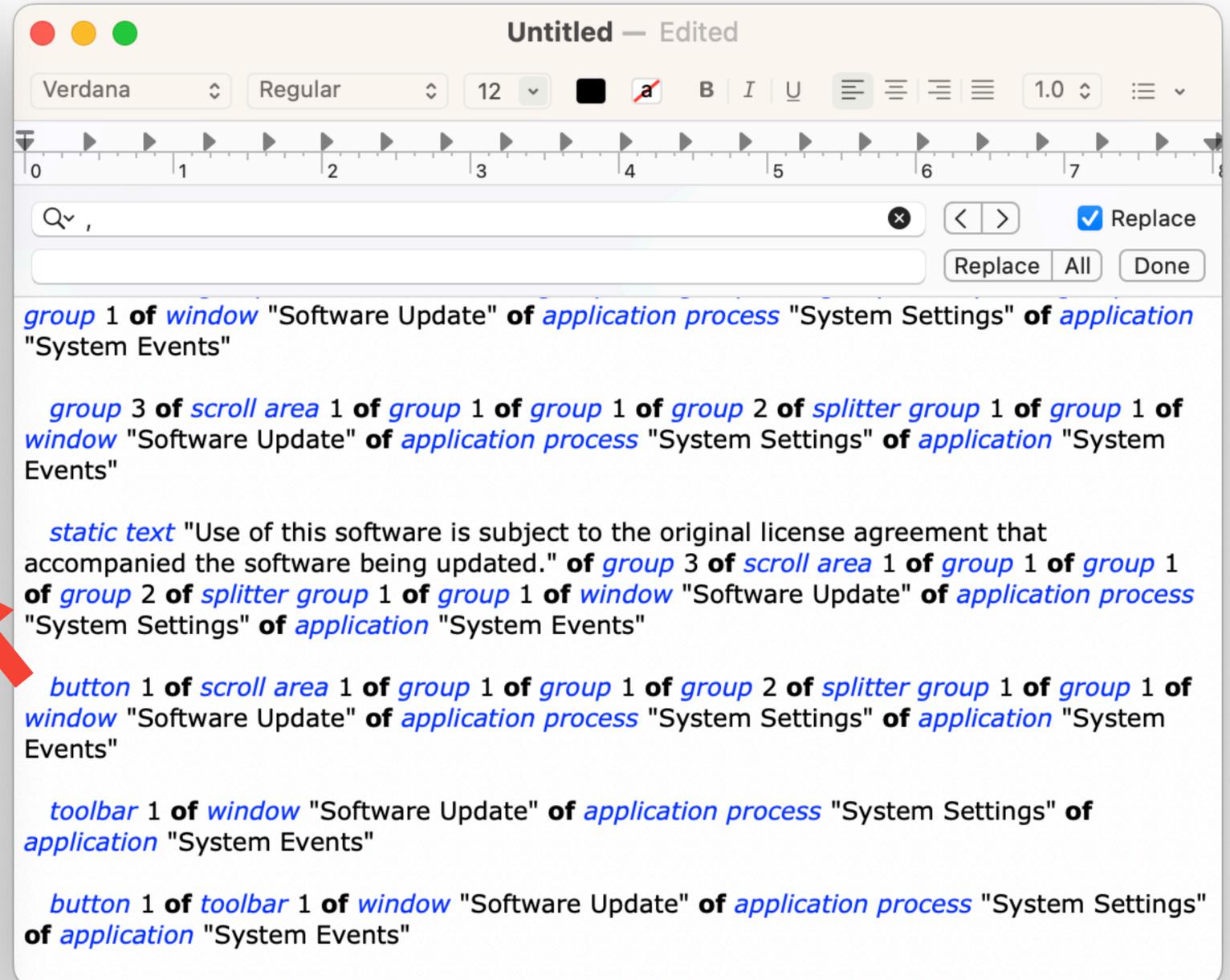
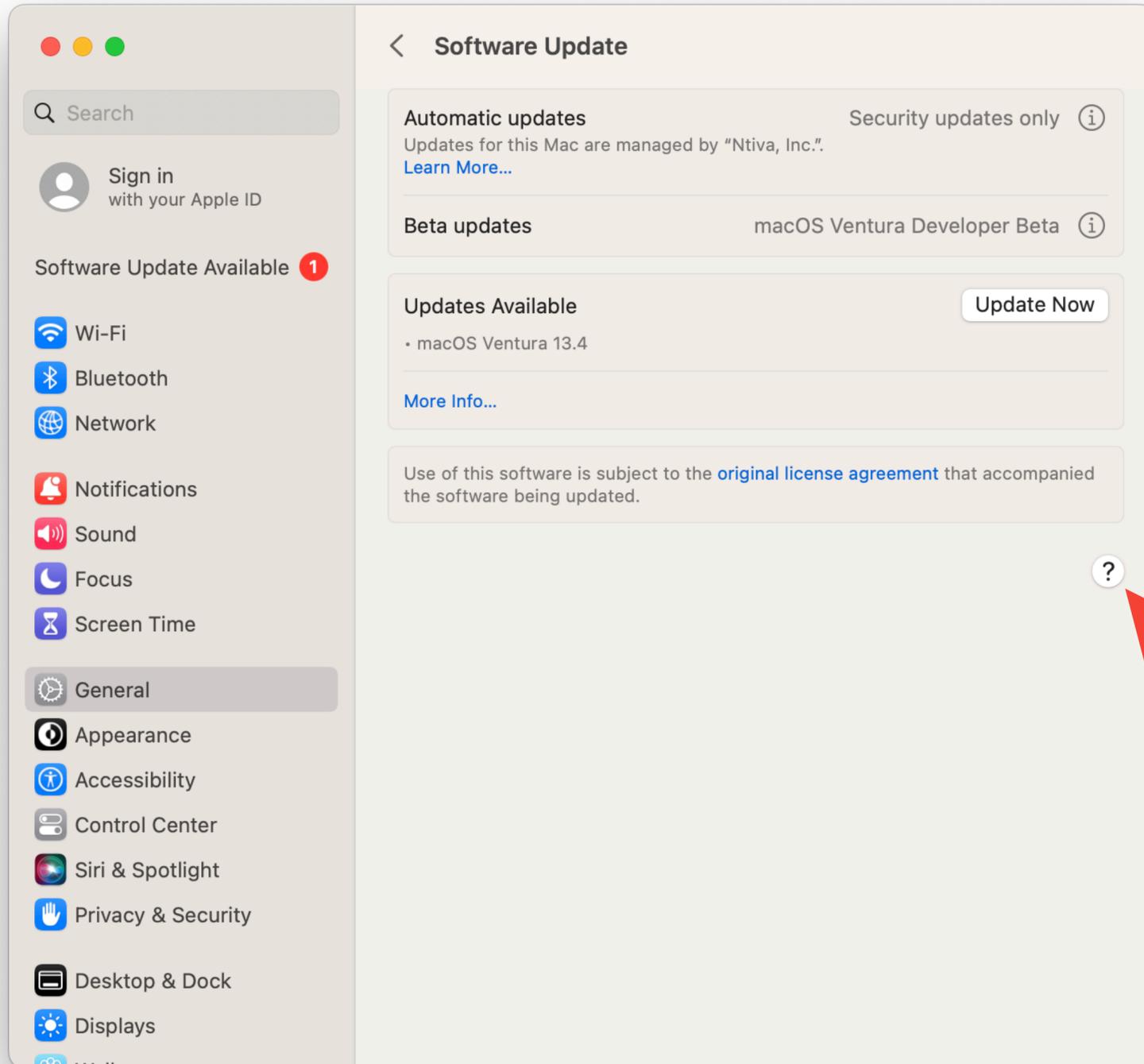
2 - Define element



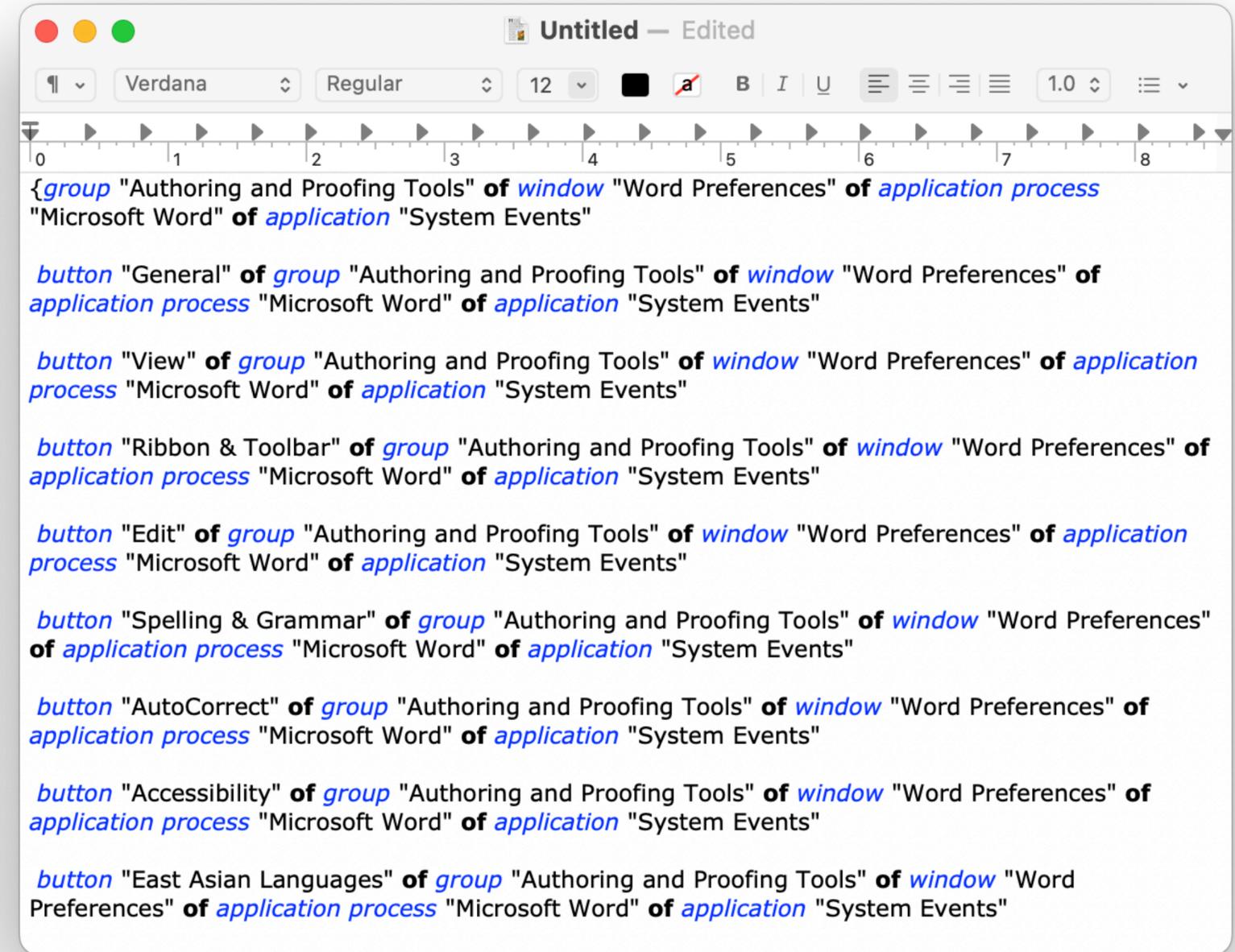
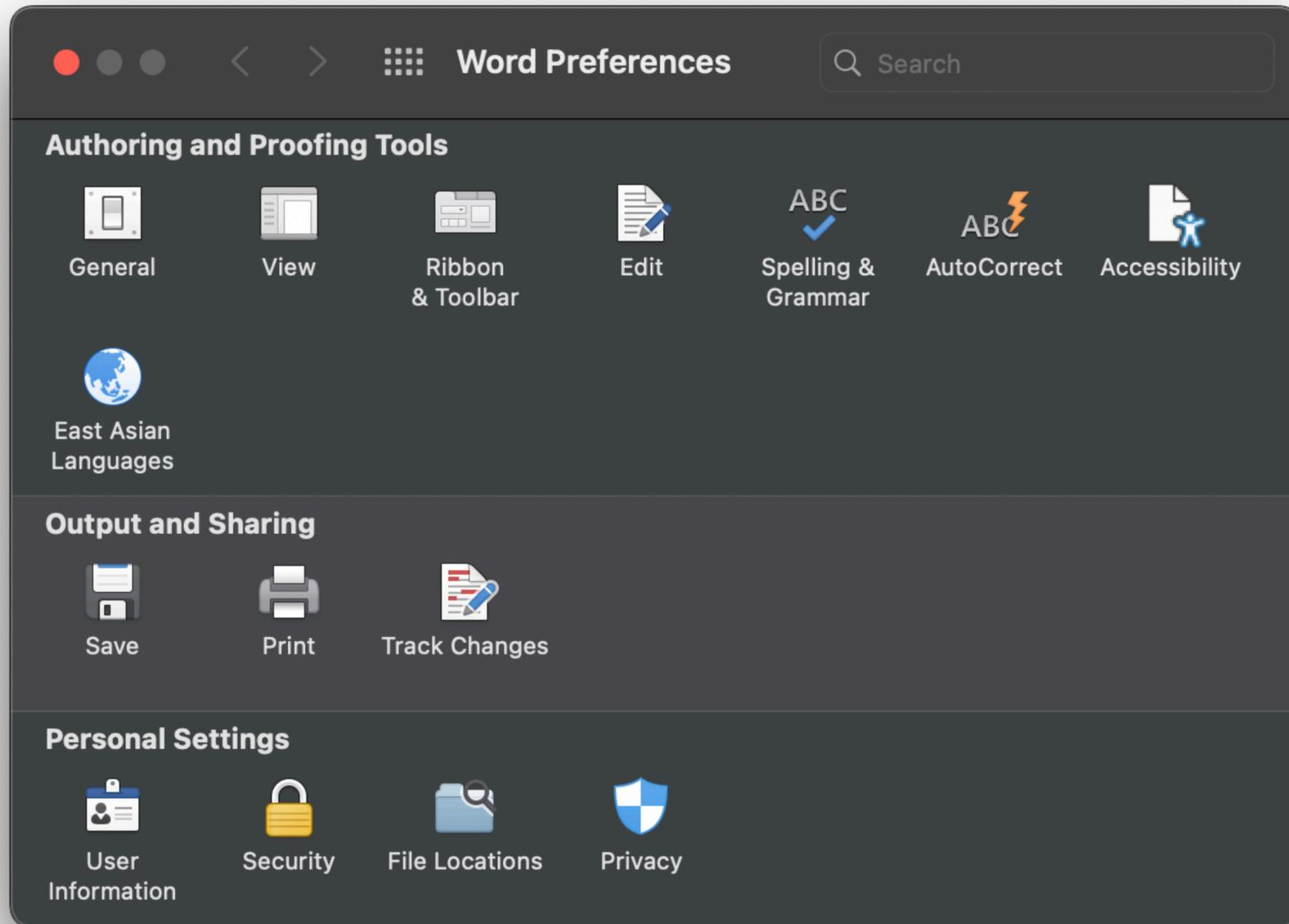
2 - Define element



2 - Define element



2 - Define element names



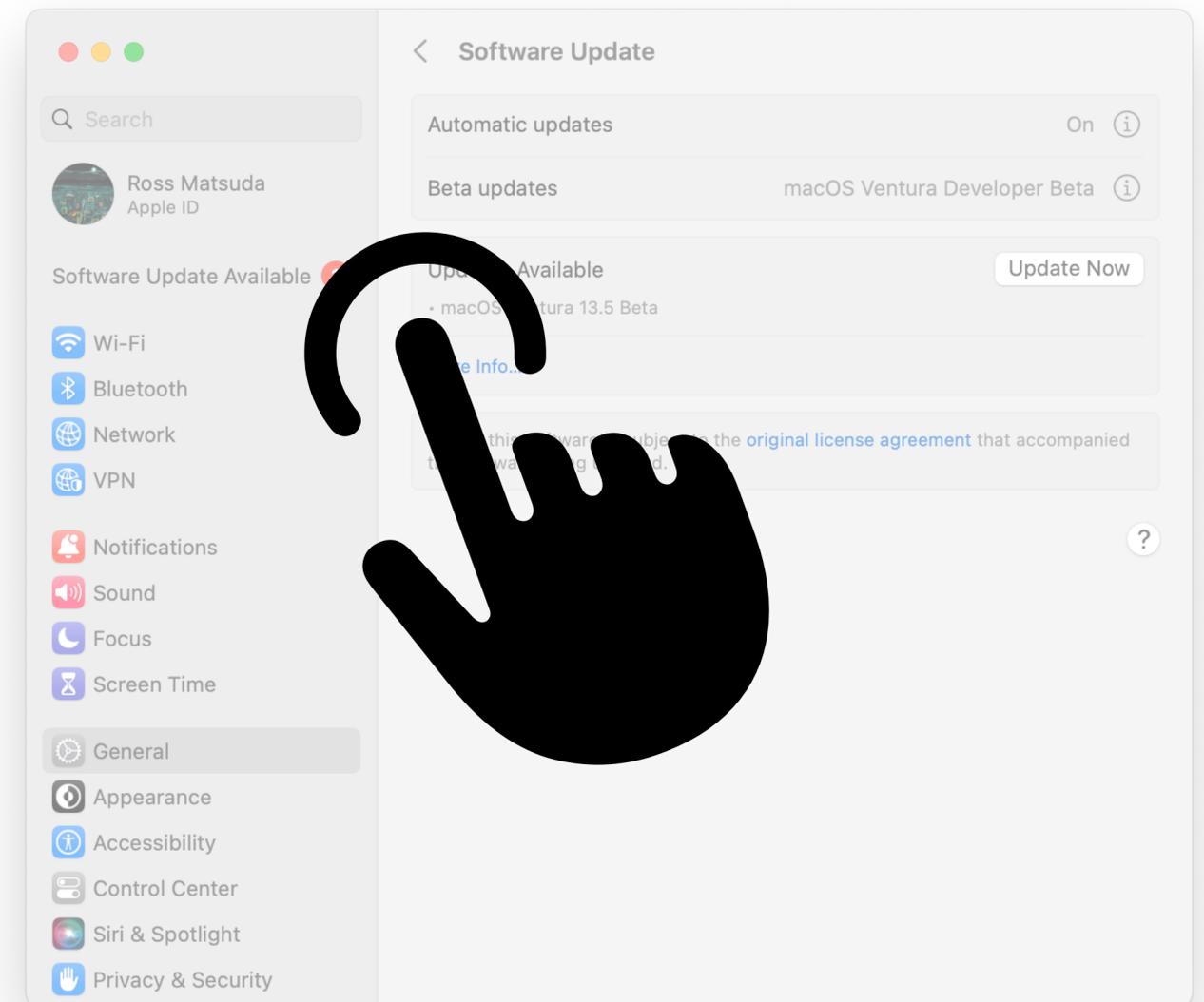
3 - Act on your targets

Click element

tell *application* "System Events"

tell *process* "System Settings"

click *button* 1 **of** *group* 2 **of** *scroll*
area 1 **of** *group* 1 **of** *group* 1 **of** *group*
2 **of** *splitter* *group* 1 **of** *group* 1 **of**
window "Software Update" **of**
application *process* "System Settings"
of *application* "System Events"



3 - Act on your targets

Click element

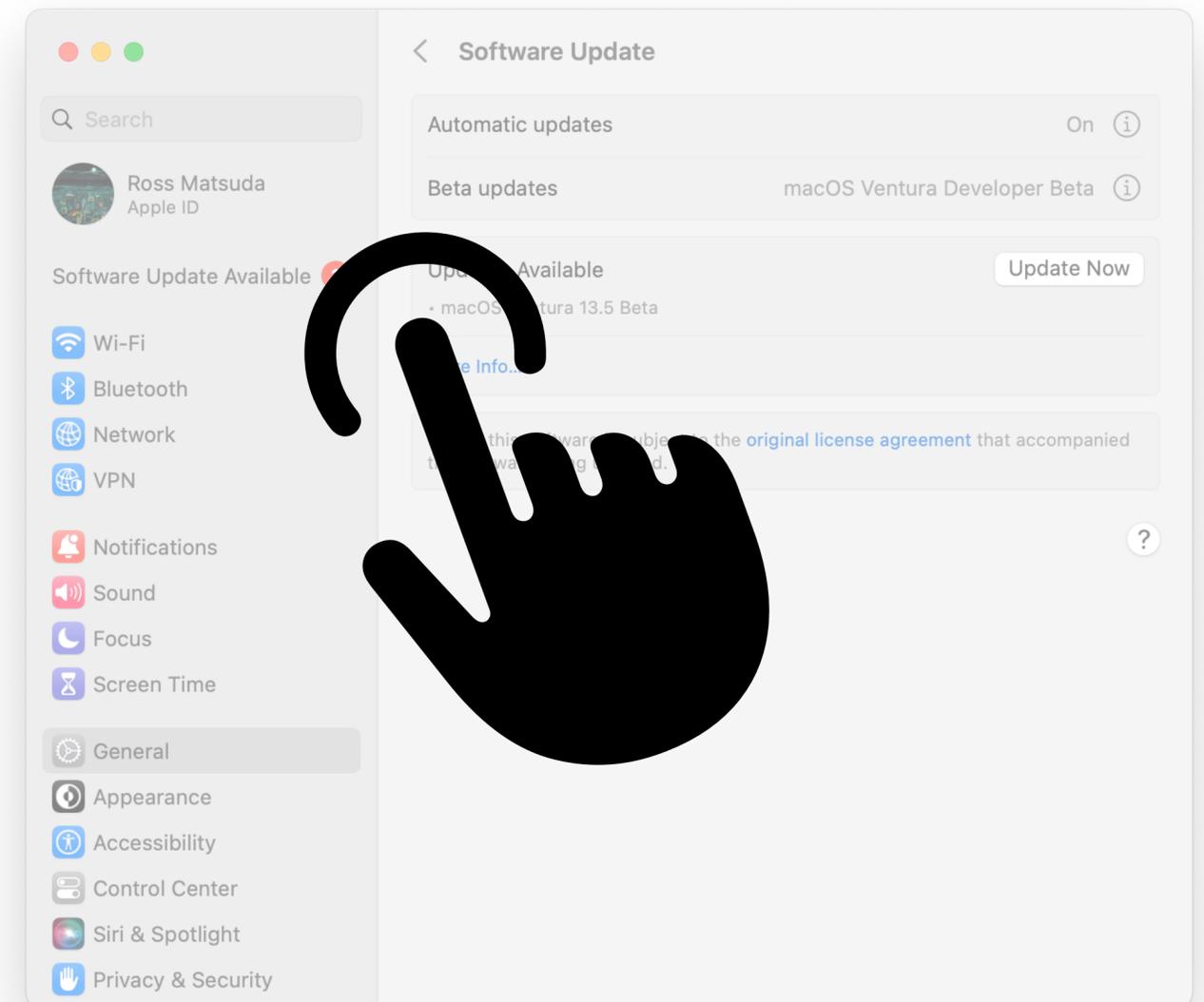
tell *application* "System Events"

tell *process* "System Settings"

click *[the thing]*

end tell

end tell



3 - Act on your targets

Send keystroke

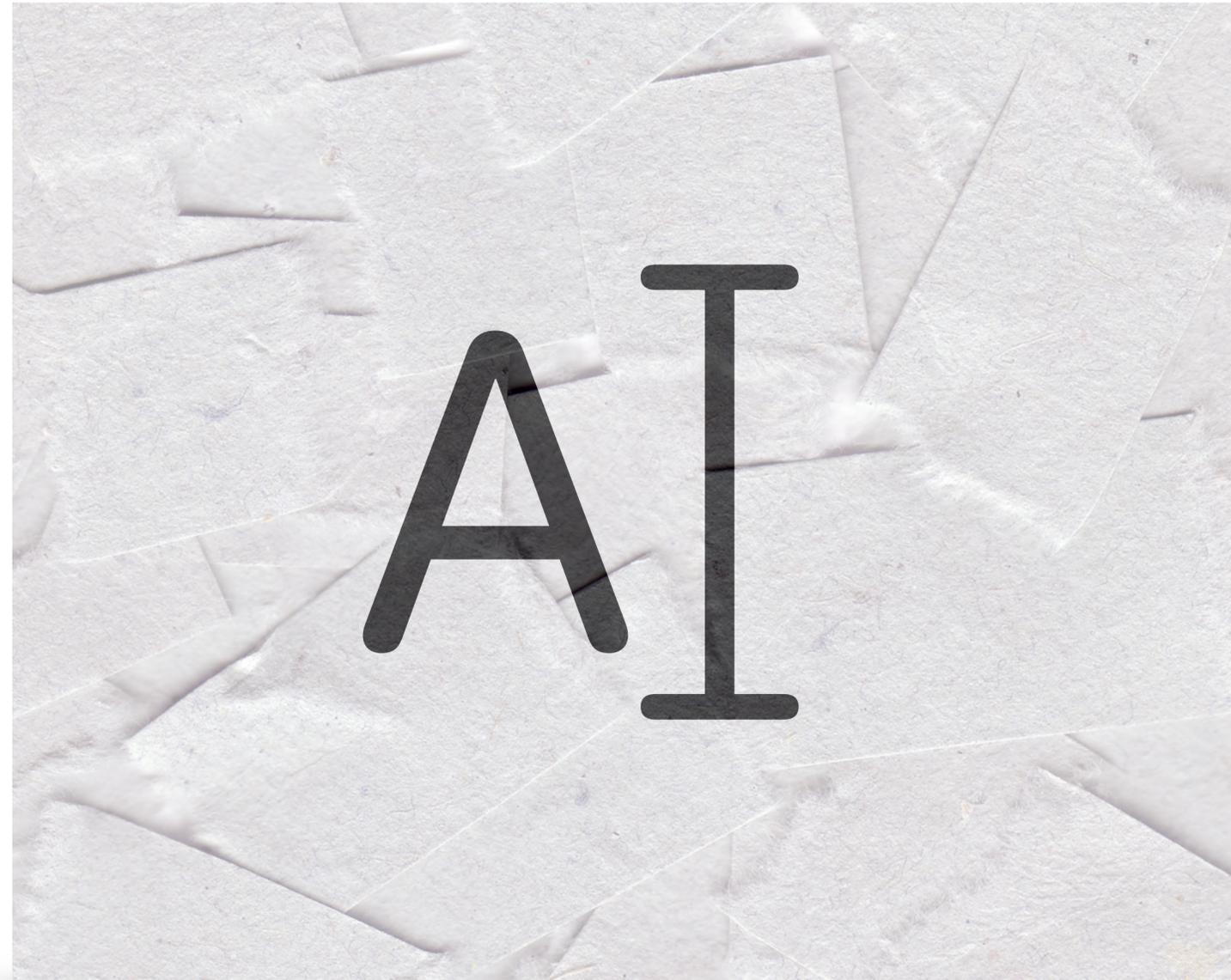
```
tell application "Microsoft Word"  
  activate  
end tell  
tell application "System Events"  
  key down {command}  
  keystroke ", "  
  key up {command}  
end tell
```



3 - Act on your targets

Selecting and filling text fields

```
tell application "Microsoft Word"  
  activate  
end tell  
tell application "System Events"  
  set focused of text field 1 of group 2 of  
    toolbar 1 of window "Word Preferences"  
  of application process "Microsoft Word"  
  of application "System Events" to true  
  keystroke "spelling"  
  key code 125  
  key down {return}  
  key up {return}  
end tell
```



3 - Act on your targets

Selecting and filling text fields

```
tell application "Microsoft Word"  
  activate  
end tell  
tell application "System Events"  
  set focused of [text field] to true  
  keystroke "spelling"  
  key code 125  
  key down {return}  
  key up {return}  
end tell
```

ARROW KEYS

LEFT	key code 123
RIGHT	key code 124
DOWN	key code 125
UP	key code 126

3 - Act on your targets

Selecting and filling text fields

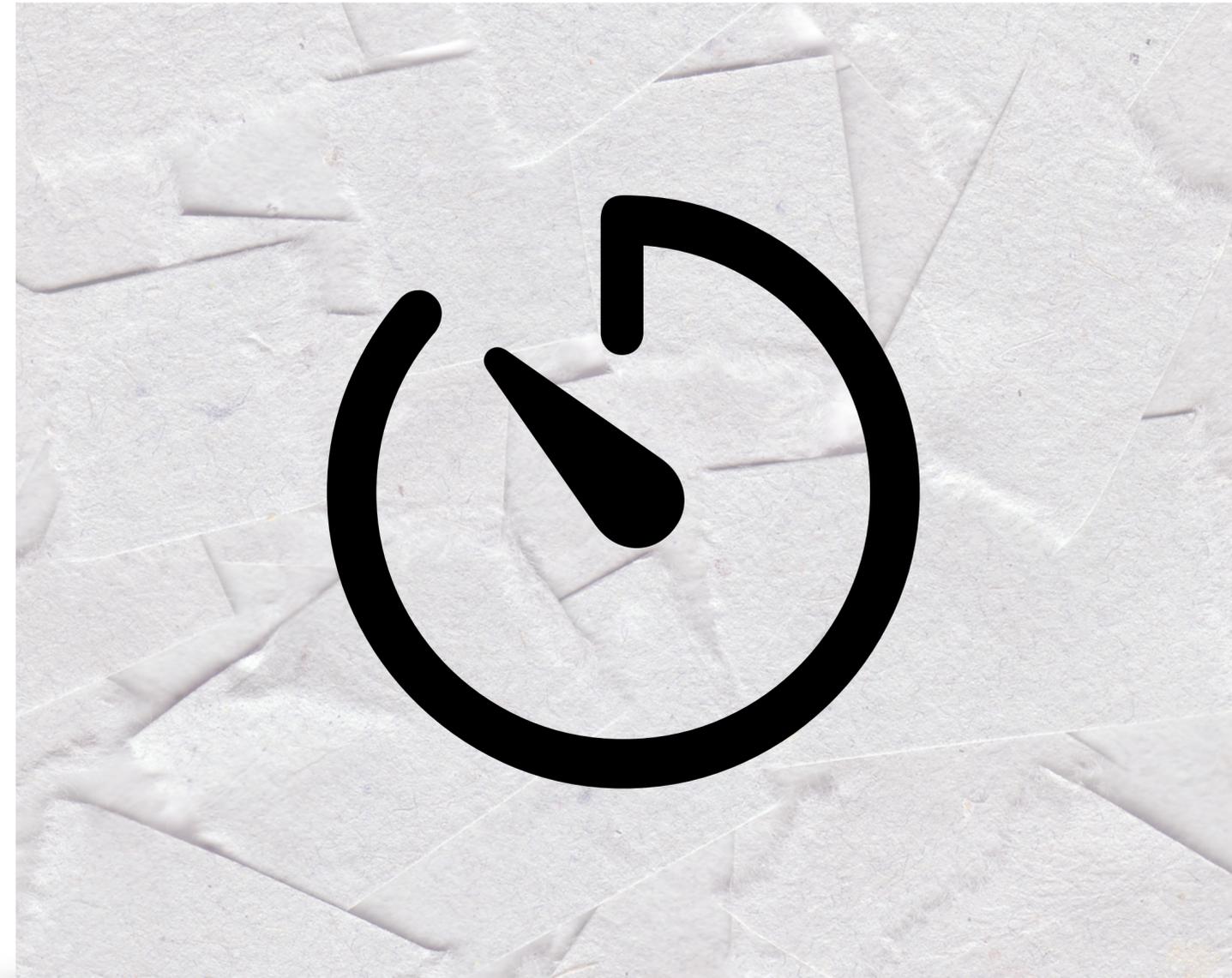
```
tell application "Microsoft Word"  
  activate  
end tell  
tell application "System Events"  
  key code 123 using {shift down,  
    option down, command  
    down}  
end tell
```

ARROW KEYS

LEFT	key code 123
RIGHT	key code 124
DOWN	key code 125
UP	key code 126

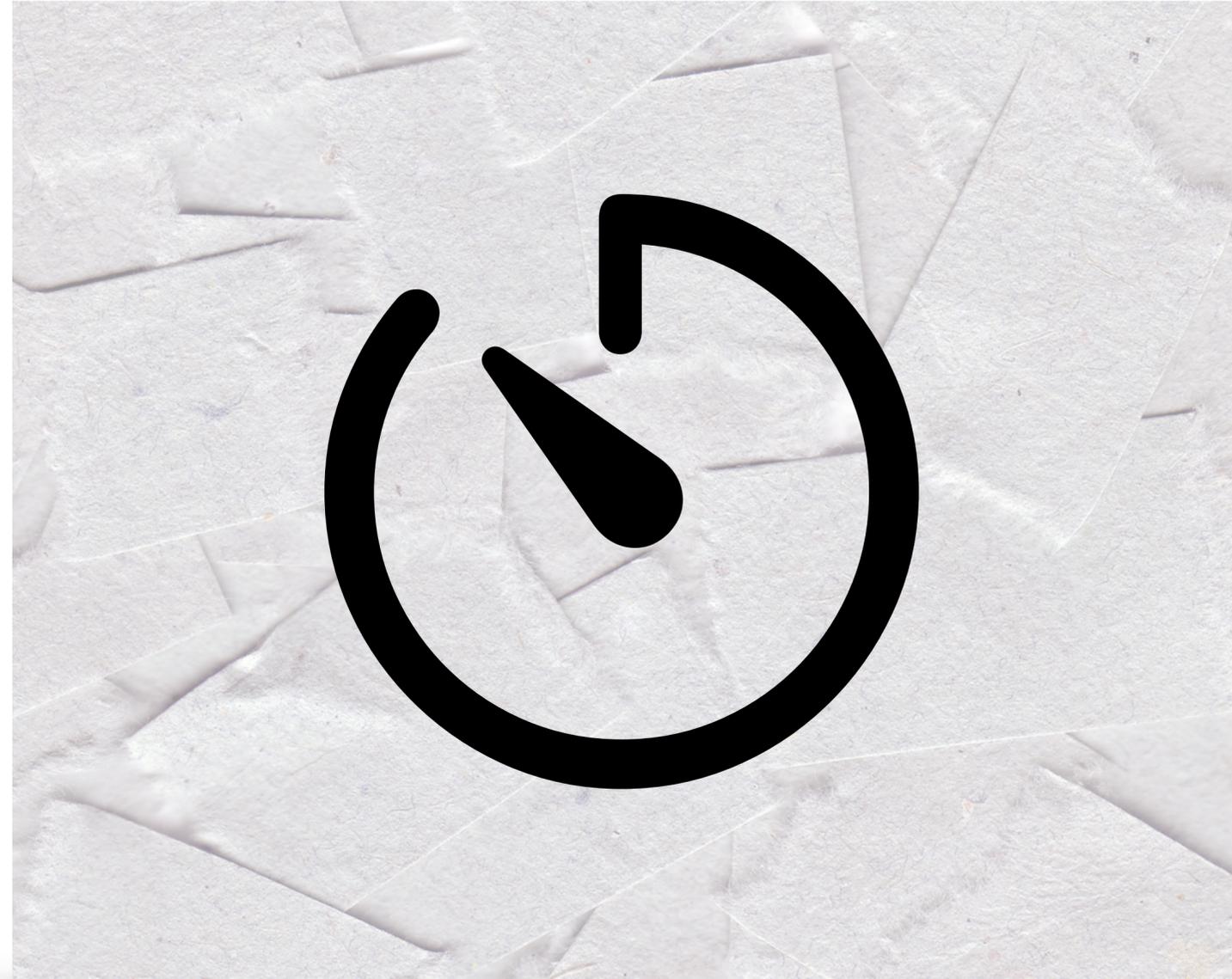
4 - Timing

```
if exists (button 1 of group 2 of scroll area 1 of group 1 of  
    group 1 of group 2 of splitter group 1  
    of group 1 of window "Software  
    Update" of application process  
    "System Settings" of application  
    "System Events") then  
    click button 1 of group 2 of scroll area 1 of group 1 of  
        group 1 of group 2 of splitter  
        group 1 of group 1 of window  
        "Software Update" of application  
        process "System Settings" of  
        application "System Events"  
end if
```



4 - Timing

if exists (*[the thing]*) **then**
click *[the thing]*
end if

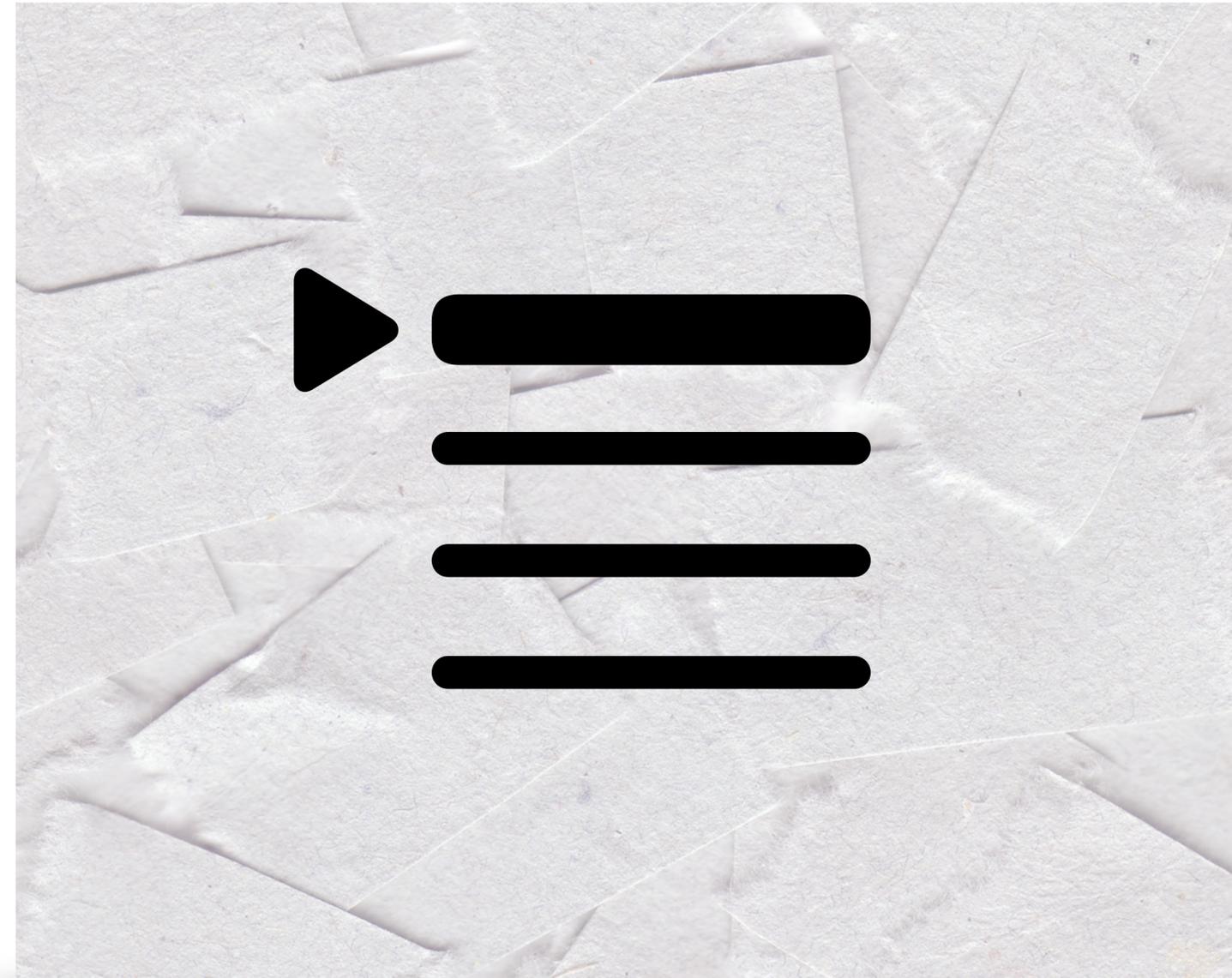


```
tell application "System Events"  
  repeat 60 times  
    if exists (window 1 of process "System Settings") then  
      delay 3  
      exit repeat  
    else  
      delay 1  
    end if  
  end repeat  
  
  if not (exists (window 1 of process "System Settings")) then  
    error number -128  
  end if  
end tell
```

5 - Versioning

macOS version logic:

- Switch statement or ifs



```
# Get Major OS (10, 11, 12, etc.)  
set OSmajor to system attribute "sys1"
```

```
# Bailout if old version  
if OSmajor < 11 then  
    log "Catalina or earlier detected"  
    error number -128  
end if
```

```
# Ventura  
if (OSmajor = 13) then  
    log "Ventura detected"  
end if
```

```
# Monterey and Big Sur  
if OSmajor < 13 then  
    log "Monterey or Big Sur detected"  
end if
```

```
# Sonoma  
if (OSmajor = 14) then  
    log "Sonoma detected"  
end if
```

macOS Big Sur & Monterey

- Logic still works
- Opens “More Info” window via synthetic click

macOS Big Sur & Monterey

- Adding logic to check checkboxes

```
if not (value of checkbox 1 of UI element 1 of row 1 of table 1 of scroll area 2 of sheet 1 of window "Software Update" of application process "System Preferences" of application "System Events" as boolean) then  
  click checkbox 1 of UI element 1 of row 1 of table 1 of scroll area 2 of sheet 1 of window "Software Update" of application process "System Preferences" of application "System Events"  
end if
```

macOS Big Sur & Monterey

- Adding logic to check checkboxes

```
if exists ([checkbox]) then  
    if not (value of [checkbox] as boolean)  
        then  
            click [checkbox]  
        end if  
    end if  
end if
```

macOS Big Sur & Monterey

- Adding logic to check checkboxes

checkbox 1 of UI element 1 of row 1 of table 1 of scroll area 2 of sheet 1 of window "Software Update" of application process "System Preferences" of application "System Events"

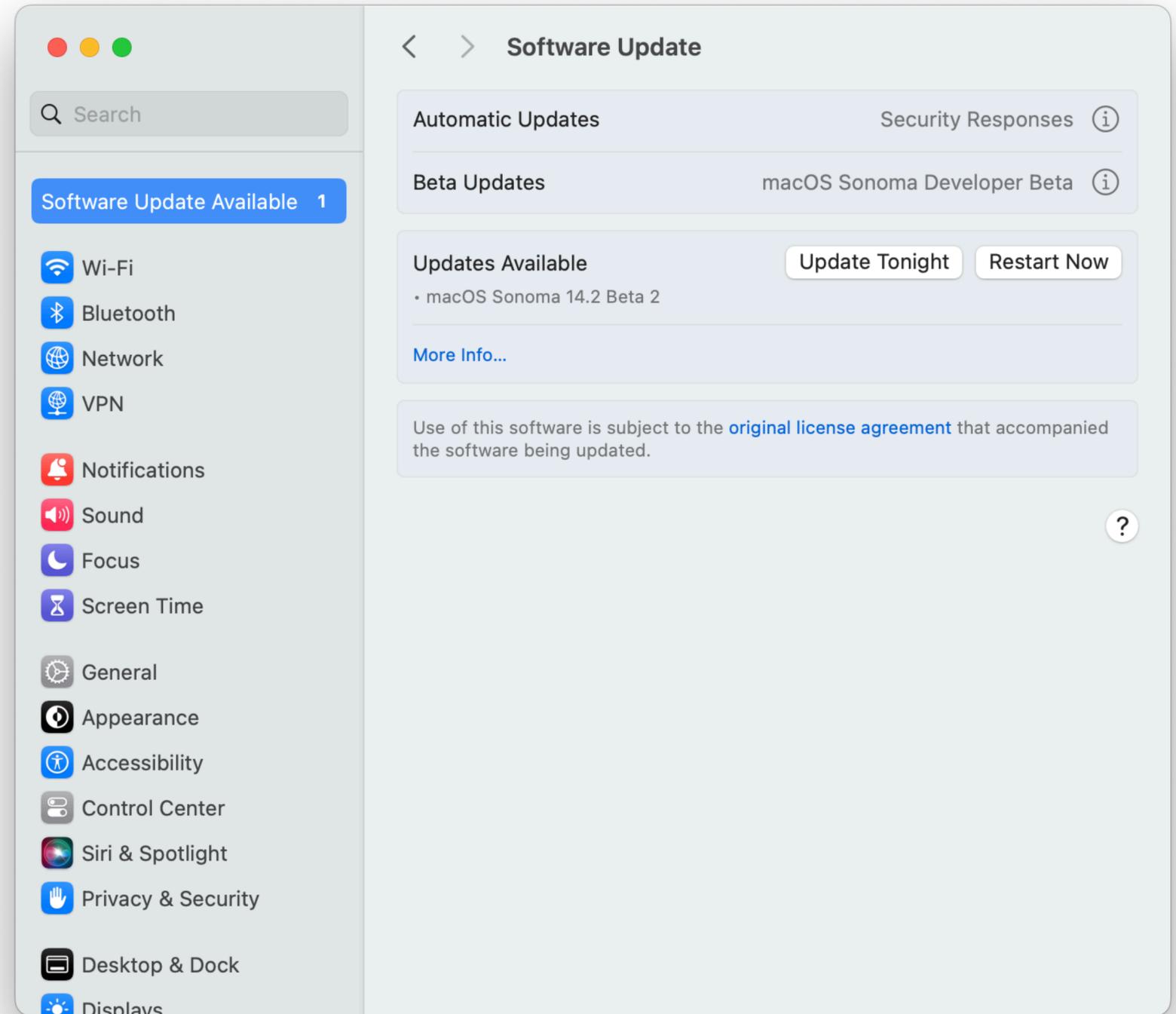
macOS Big Sur & Monterey

- Adding logic to check checkboxes

checkbox 1 of UI element 1 of row 1 of table 1 of scroll area 2 of sheet 1 of window "Software Update" of application process "System Preferences" of application "System Events"

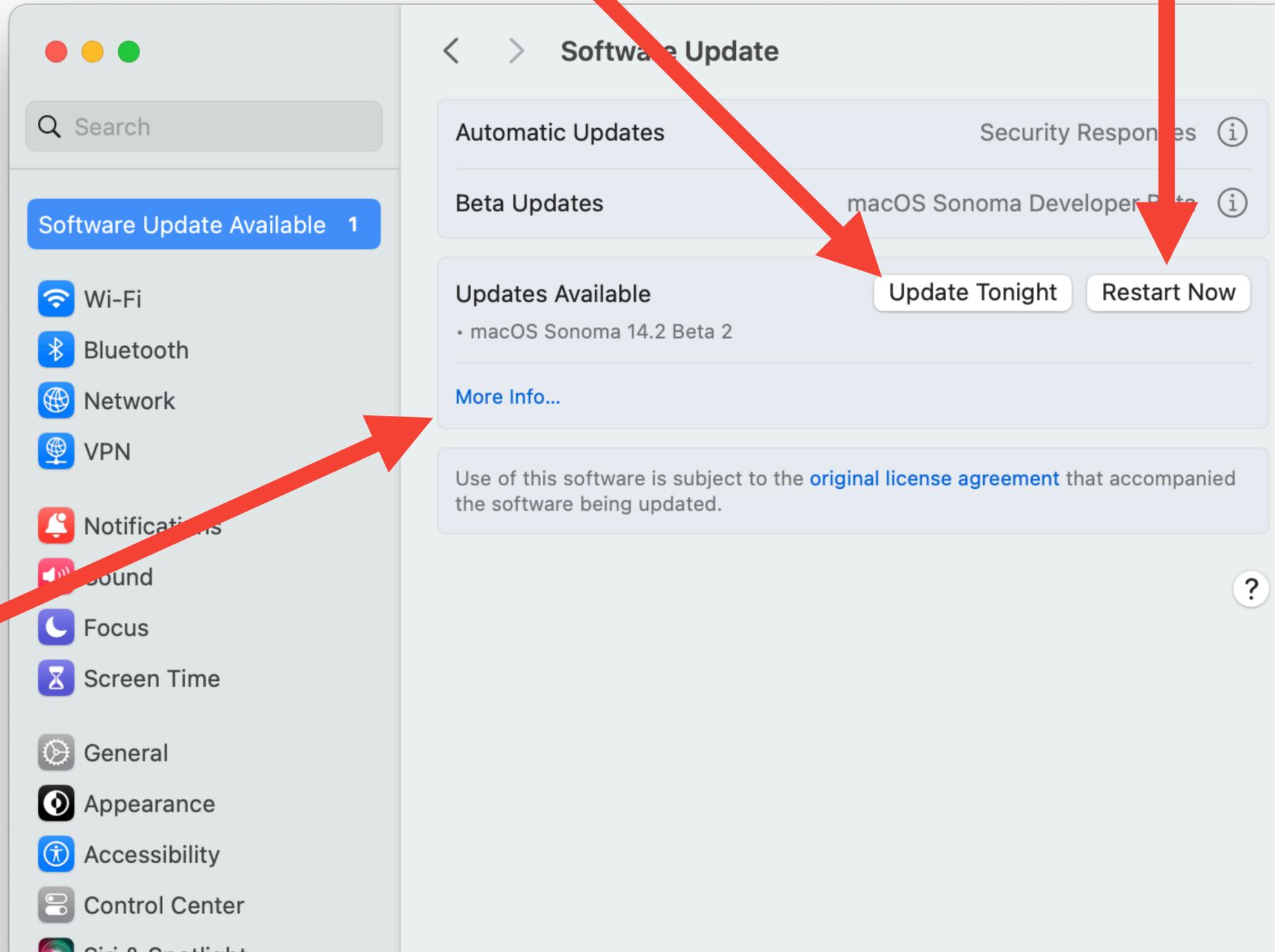
macOS Sonoma

- Click “Update/Restart Now” button
- Detects optional “Update Tonight” button
- Script halts at EULA or credential request



macOS Sonoma

- The optional “Update Tonight” button



Click "Update Now" or "Restart Now" if present

tell *application* "System Events"

tell *process* "System Settings"

repeat 60 **times**

 # 3-button logic - if button 3 exists (indicating both "Update Tonight" and "Restart Now" buttons are present) , click button 2 for "Restart Now"

if exists (*button* 3 **of** *group* 2 **of** *scroll area* 1 **of** *group* 1 **of** *group* 2 **of** *splitter group* 1 **of** *group* 1 **of** *window* "Software Update"

of *application process* "System Settings" **of** *application* "System Events") **then**

click *button* 2 **of** *group* 2 **of** *scroll area* 1 **of** *group* 1 **of** *group* 2 **of** *splitter group* 1 **of** *group* 1 **of** *window* "Software Update"

of *application process* "System Settings" **of** *application* "System Events"

exit repeat

end if

 # 2-button logic ("Update Now" and "More Info...") - click "Update Now"

if exists (*button* 1 **of** *group* 2 **of** *scroll area* 1 **of** *group* 1 **of** *group* 2 **of** *splitter group* 1 **of** *group* 1 **of** *window* "Software Update"

of *application process* "System Settings" **of** *application* "System Events") **then**

click *button* 1 **of** *group* 2 **of** *scroll area* 1 **of** *group* 1 **of** *group* 2 **of** *splitter group* 1 **of** *group* 1 **of** *window* "Software Update"

of *application process* "System Settings" **of** *application* "System Events"

exit repeat

end if

tell *application* "System Events"

if *application process* "System Settings" **exists then**

delay 0.5

else

exit repeat

end if

end tell

delay 1

end repeat

end tell

end tell

```
# Click "Update Now" or "Restart Now" if present
```

```
tell application "System Events"
```

```
  tell process "System Settings"
```

```
    repeat 60 times
```

```
      # 3-button logic - if button 3 exists (indicating both "Update Tonight" and "Restart Now" buttons are present),  
      click button 2 for "Restart Now"
```

```
      if exists ([button 3]) then
```

```
        click [button 2]
```

```
        exit repeat
```

```
      end if
```

```
      # 2-button logic ("Update Now" and "More Info...") - click "Update/Restart Now"
```

```
      if exists ([button 1]) then
```

```
        click [button 1]
```

```
        exit repeat
```

```
      end if
```

```
tell application "System Events"
```

```
  if application process "System Settings" exists then
```

```
    delay 0.5
```

```
  else
```

```
    exit repeat
```

```
  end if
```

```
end tell
```

```
  delay 1
```

```
end repeat
```

```
end tell
```

```
end tell
```

macOS Ventura

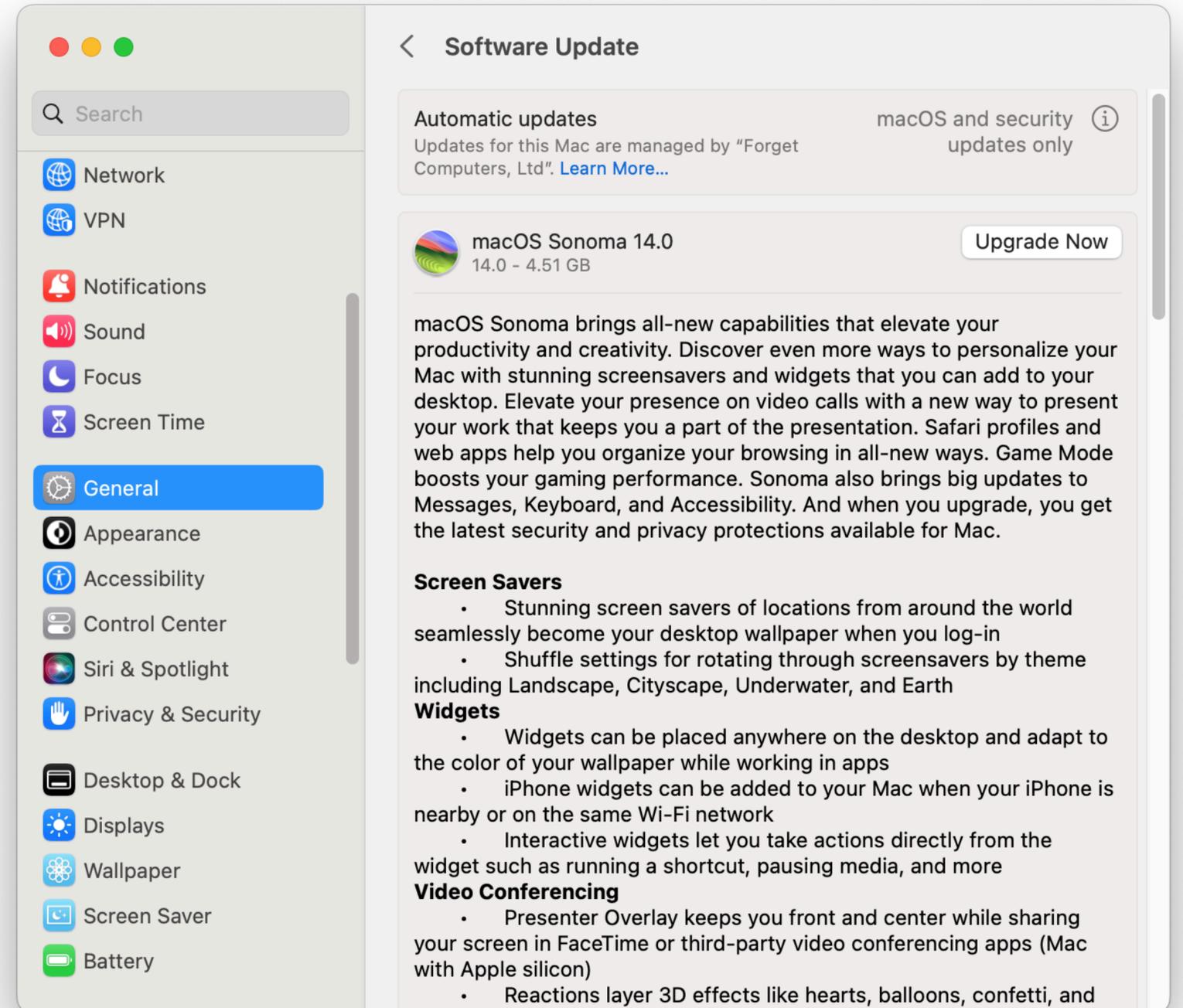
- Two separate outcomes
- macOS banner hidden (deferred)
- macOS upgrade banner detected

macOS Ventura - no banner

- Click “Update Now” button
- User stopped at EULA or credential request

macOS Ventura - Upgrade banner

- All logic unusable
- What can we do here?
- Scroll to bottom of view
- Popup window instructing user of next steps



macOS Ventura - Upgrade banner present

- How to tell if the banner is present?

```
set uiElems to entire contents of group 2 of  
splitter group 1 of group 1 of window "Software Update"  
#uiElems is generated as a LIST
```

```
log "Now checking for Sonoma string"  
repeat with i in uiElems  
  if class of i is static text then  
    set R to value of i  
    log "Value of static text is"  
    log R  
    if R contains "Sonoma" then  
      log "Sonoma detected"
```

macOS Ventura - Upgrade banner present

- Scroll the window down
- Values: 0.0 - 1.0

```
set value of scroll bar 1 of scroll area 1 of  
group 1 of group 1 of group 2 of splitter  
group 1 of group 1 of window "Software  
Update" of application process "System  
Settings" of application "System Events" to  
1.0
```

macOS Ventura - Upgrade banner present

- Scroll the window down
- Values: 0.0 - 1.0

set value of [scroll bar 1] to 1.0

macOS Ventura - Upgrade banner present

- Osascript popup

display dialog "To start your update, look for the 'Other Updates Available' section we've scrolled to and click the 'More Info...' button to begin the update." **with title** "Click the 'More Info' button to continue" **buttons** {"OK"} **with icon** *POSIX file* "/System/Library/PrivateFrameworks/OAHSoftwareUpdate.framework/Versions/A/Resources/SoftwareUpdate.icns" **default button** {"OK"}

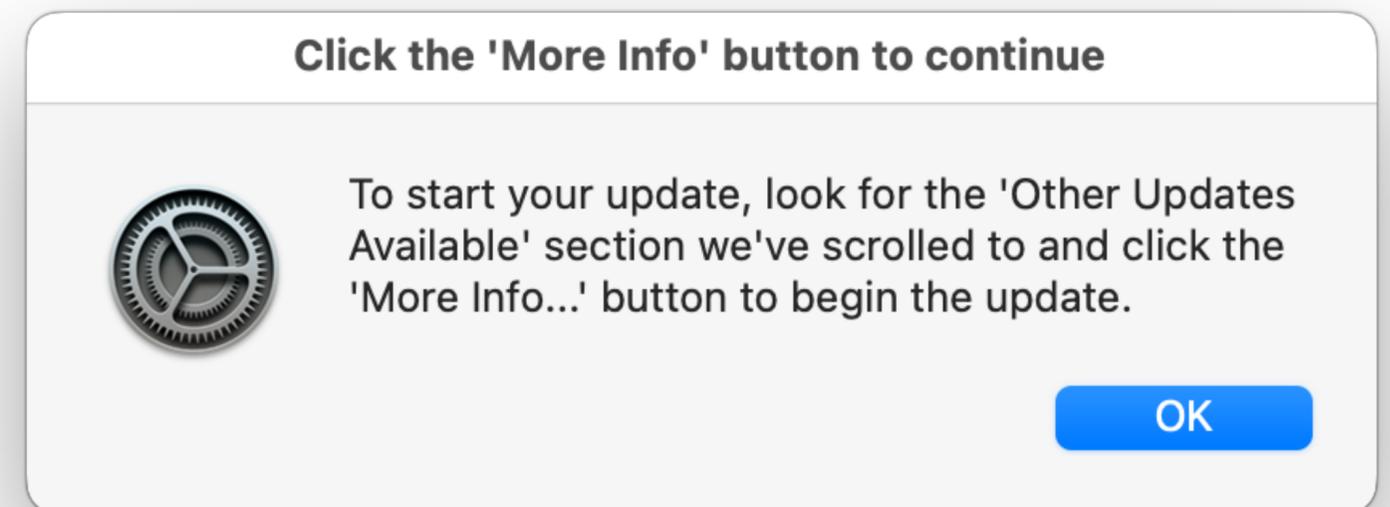
display dialog "To start your update, look for the 'Other Updates Available' section we've scrolled to and click the 'More Info...' button to begin the update."

with title "Click the 'More Info' button to continue"

buttons {"OK"}

with icon *POSIX file* "/System/Library/PrivateFrameworks/OAHSoftwareUpdate.framework/Versions/A/Resources/SoftwareUpdate.icns"

default button {"OK"}



Regarding the "More Info" target in macOS 13+

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<https://www.sudoade.com/scripting-the-unscriptable-macadmins-2023-presentation/>

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