Visual Disabilities

Tactiles / Braille Embossing

Tactile graphics deliver information through touch. One way to utilize tactile graphics is by use of a PIAF (Pictures in a Flash) machine. Using heat-sensitive capsule paper, PIAF's controlled heat source causes any black lines, letters or shapes that are drawn, printed or copied onto the capsule paper to swell resulting in an instant tactile graphic. This graphic can then be used by a student as is, or can be used in conjunction with tactile-audio system like the "Talking Tactile Tablet" or "IVEO". The IVEO tactile-audio system is a self-voicing system used to make tactile-audio diagrams like maps and graphs to make them speak when touched on the IVEO Touchpad. This is recommended primarily for blind or low-vision students. The Talking Tactile Tablet or TTT operates in the same fashion as the IVEO, but is designed with less emphasis on visual interaction and more on interacting with the tablet itself.

The Braille embosser converts text and/or graphics to Braille to be read by students who are Braille readers. Files can be printed (embossed) or read by students who have a refreshable Braille display. Braille embossing is recommended for blind students who can read Braille.

In one case there is a student who uses both tactile graphics and a refreshable Braille display to do classwork in a physics lab. The student is visually impaired and the lab is very hands on. With the help of a tape recorder, the student is able to record lectures and review key points of the lesson. The student is able to use the refreshable Braille display to take notes, as well as use the device to do math calculations and timing exercises related to the class. Then using a PIAF machine, we can take a 2D line graph picture and turn it into a graph that the student can feel the different points and lines for the data inputted.

CATS support and provide technical help and assistance for this AT which includes, usage, and troubleshooting.

ZoomText

ZoomText is a screen-enlarger and reader. Once installed on a computer, ZoomText will magnify the screen at the default setting of 2x magnification. Students with visual impairments can benefit from the use of this program because when ZoomText does magnify the screen in a given area, the image doesn't become too distorted to the point where the student can only identify color or shape at best. With different magnification levels, color contrast, ZoomText is one of the most frequently used AT software in our labs. ZoomText benefits anyone who has trouble reading print on the screen or identifying pictures from a small image. With ZoomText, students are able to adjust the magnification level of the screen to suit their visual needs. This helps them to be more independent in their own studies, whether it is reading or writing.

The App Reader for ZoomText is also a useful tool as students are viewing a document. ZoomText will highlight the word that is being read so that the student can follow along. Other tools such as "focus enhancement" allow a student to mouse-over a selection and see the selection highlighted more definitively so that navigation is easier for the student. There is also a "Mouse Echo" feature which will read text that the mouse pointer is hovered over. There are also different color schemes that can be applied in case a given student is color blind or is able to see better with different color schemes.

CCTV

Closed Circuit Televisions are used by students who have printed material that they need to have magnified. Some of the newer CCTVs are in High Definition, which makes the magnification of any printed material much more clear. Students can use the CCTV to look at small print in a text book or an exam. There are also different color schemes that students can switch to, such as white font on a black background or a yellow/blue color scheme. This is easily done by pushing a button on the CCTV itself, which allows the student to make adjustments to the way they view the material on the screen.

The Ruby is a CCTV which takes compact magnification to a new level and beyond. This device helps you to see everything with enhanced contrast and no distortion. Ruby also comes with a handle so you can use just like a regular magnifying glass. You can also fold the handle under and place the Ruby flat on the paper or wherever it is you need magnification. It has a Freeze Frame with the capacity to

change magnification. The Ruby can now save up to 15 images with full color plus four enhanced contrast modes for reading.

With the ability to take and store photos, this allows an individual using the RUBY to now be able to make adjustments or be able to hold the device to their comfort level without having to keep the RUBY over the text.   This device is perfect for people who are constantly on the move but need to carry something with them to help them read information. In the picture below, a person is using the device so that they can read the items from a menu. It can also be used for map-reading where magnification and little distortion make it easier to navigate.

In the classroom, the RUBY gives students more independence. The RUBY is a tool that can help low-vision students be able to read their own material, rather than having someone else read it

Large Print

There are times where a student with low-vision may need material printed out for them. Depending on the student's visible capabilities, enlarging the print to a font size of "22" and changing the font to "Arial". "Arial" is a clear and easy to read font, and all that would need to be changed is the size of the font if a student is still having trouble reading at size "22".

Benefits

These forms of AT are most beneficial to students who have visual disabilities and trouble reading small print. ZoomText is best used for students who have something on the computer already that they need to see in a larger size or in a different color scheme. With the reader function to go along with it, this further helps the student understand the material as they follow along. Large print is more beneficial to students who need to have a hard copy of given material that they can read without extra assistance from other AT. Since not all material, is in a digital format, CCTVs are an important piece of AT. Material that is difficult to properly scan can be viewed under a CCTV and magnified and focused clearly for a student to be able to read.

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JAWS

JAWS is an assistive technology in the category of screen-reader program and is designed for blind and visually impaired individuals to use and control a personal computer and applications. CATS is currently supporting JAWS version 12.0 on a network license server allowing for all of your JAWS users to be provided this crucial support.

In New York City, many CUNY students have received assistive technology training from the NY State Commission for the Blind and or local training rehabilitation agencies such as the Lighthouse, International, Helen Keller Services for the Blind or the Baruch College Center for Visually Impaired People (CCVIP) and as such should be proficient in basic computer and JAWS usage.

Screen reader software describes labels, written text, buttons and other objects displayed on a computer screen thus enabling blind or low vision users to hear a description of both the contents of and location in a specific application or program.

Screen readers can be used in spreadsheet, database or web browsing software and can provide maximum accessibility to the user. Most applications used by CUNY students have been thoroughly tested and work well with JAWS, requiring minimal training on the part of the user. There are also a group of related applications that work well with JAWS that provide accessibility including Open Book, an OCR reading application and Magic a screen enlarger / reader.

JAWS users should be proficient in basic Windows navigation and be clear on the purpose of the various types of objects and features used in Windows, i.e.: lists, drop-down boxes, buttons and menus and message boxes. Screen reader users need to know how type and use a computer keyboard and know its various components, including the numeric keypad, function keys and the CTRL, ALT and Start / Windows keys.

Comprehensive list of keyboard keystroke combinations is available for JAWS and

Windows applications and provides an efficient means for screen readers to use a personal computer. You can find a complete list of these keystrokes in the JAWS Help menu and additional training materials are available on the manufacturer's website at www.freedomscientific.com. You may also contact CATS for help.

Some tips and considerations to keep in mind:

While most mainstream applications like Word or Excel can be navigated with a few simple keystrokes, you should be aware that whenever using JAWS with HTML based programs such as web browsers, email clients or many Help screens there is an additional subset of keystroke commands you need to use for efficient navigation. The coding in HTML applications doesn't always correspond to the image on the screen and the graphically intensive nature of HTML based documents requires additional controls / commands to allow screen reader software to articulate the information on the screen.

In addition, not all web browsers a fully compatible with JAWS or perform exactly the same. Chrome in particular is difficult to navigate using JAWS. Firefox less so.

Tables also require additional control keystrokes for navigation and this can be disorienting in a spreadsheet and or database or on a form on a web page.

When using Windows, you should set up the display settings to reduce visual clutter for instance change the View setting in any folder to list instead of Icons as this will create a clearer and more navigable screen for your user.

JAWS Tandem is a feature that lets you access another computer running JAWS, so that you can provide hands-on technical support, write scripts from a distance, or perform remote JAWS training. This feature consists of a controller system, used by support personnel, distributors, dealers, consultants, and trainers, and a target system, which is the customer's JAWS application and computer. JAWS Tandem operation on the controller system is a subscription service, while the use of JAWS Tandem on the target system is free and always available for the end user.

A JAWS Tandem connection serves as an online meeting between two JAWS users. A meeting can be conducted over the Internet, this is known as a Tandem Center session, or over a private network, known as a Tandem Direct session. The primary connection method will be through Tandem Center, a gateway server responsible for creating meeting IDs, verifying proper use of JAWS Tandem, and providing a path

between the two systems. After the session is established, the controller can manage and run the target system's desktop.

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I. JAWS Keystrokes for Reading Text

Description	Command
Say Prior Character	**LEFT ARROW**
Say Next Character	**RIGHT ARROW**
Say Character	**NUM PAD 5**
Say Character Phonetically	**NUM PAD 5** twice quickly
Say Prior Word	**INSERT+LEFT ARROW**
Say Next Word	**INSERT+RIGHT ARROW**
Say Word	**INSERT+NUM PAD 5**
Spell Word	**INSERT+NUM PAD 5** twice quickly
Say Prior Line	**UP ARROW**
Say Next Line	**DOWN ARROW**
Say Current Line	**INSERT+UP ARROW**
Spell Current Line	**INSERT+UP ARROW** twice quickly
Say Prior Sentence	**ALT+UP ARROW**
Say Next Sentence	**ALT+DOWN ARROW**
Say Current Sentence	**ALT+NUM PAD 5**
Say to Cursor	**INSERT+HOME**
Say from Cursor	**INSERT+PAGE UP**
Spell to Cursor	**INSERT+HOME** twice quickly
Spell from Cursor	**INSERT+PAGE UP** twice quickly
Say All	**INSERT+DOWN ARROW**
Fast Forward during a Say All	**RIGHT ARROW**
Rewind during a Say All	**LEFT ARROW**
Say Color	**INSERT+5**
Say ASCII or Hexadecimal Value	**NUM PAD 5** three times quickly
Say Font	**INSERT+F,** twice quickly to display in virtual

|	viewer
Start Skim Reading	**CTRL+INSERT+DOWN ARROW**
Skim Reading dialog box	**CTRL+INSERT+SHIFT+DOWN ARROW**
Display Skim Reading Summary	**INSERT+WINDOWS Key+DOWN ARROW**
Copy Selected Text to FSClipboard	**WINDOWS Key+C**

JAWS Client Installation

1. After inserting the CD into the CD-ROM drive, Windows will automatically open a new window.
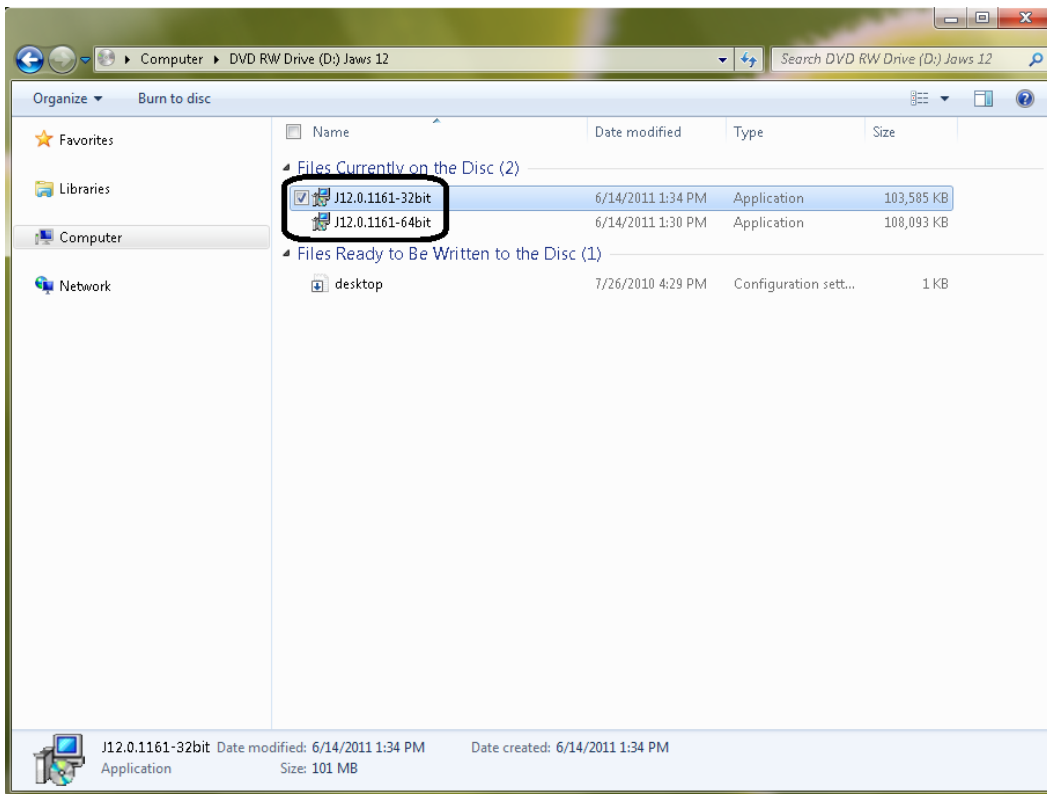   *Alternate instructions: If Windows **does not** automatically run, go to "***My***

   Computer" and locate the CD-ROM Drive and double click on it.
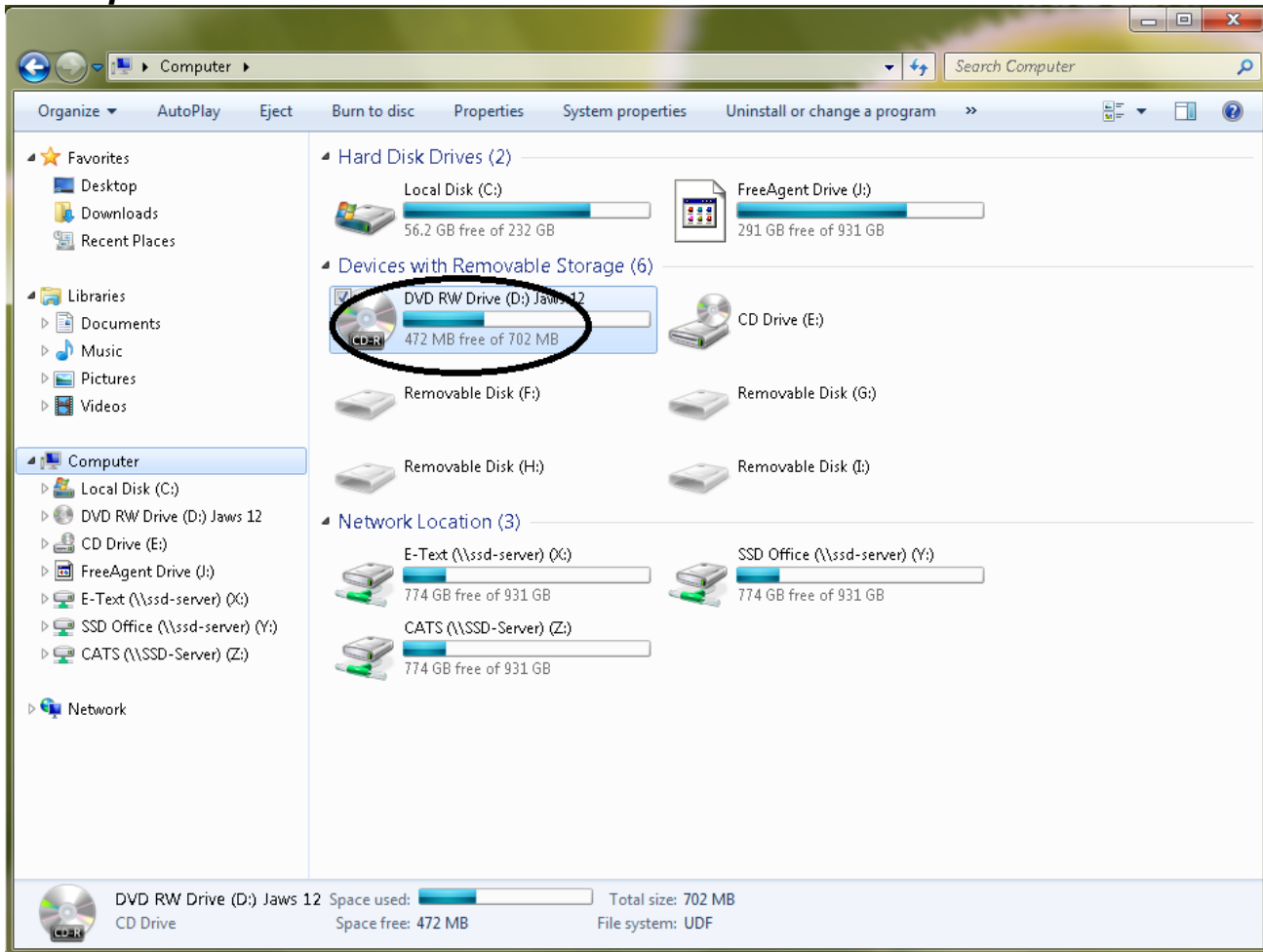
2. There will be two files located in the open window, select and double-click the appropriate version (32-bit or 64-bit) for your system.
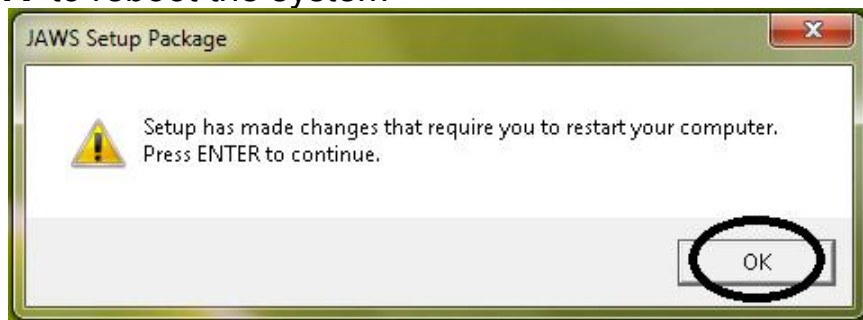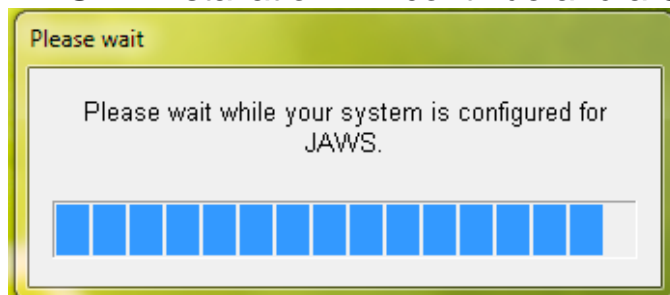   * **The 32-bit version would be the most common version used.**

3. Click on "*Next*" and the following status box will show. (Look below)
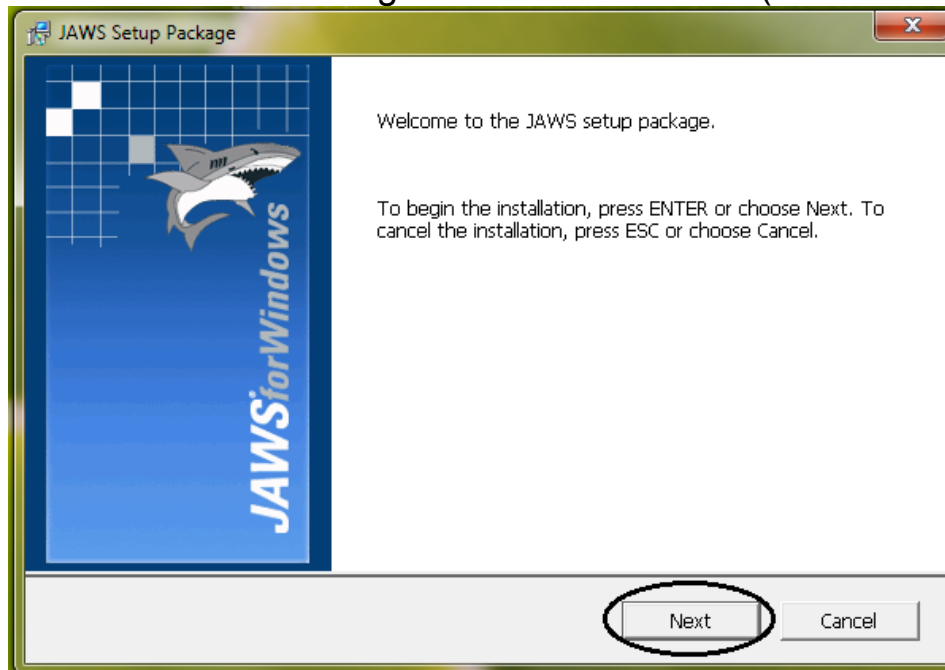
4. Click on "**OK**" to reboot the system

5. After reboot the JAWS 12 installation will continue and a Status box will show.
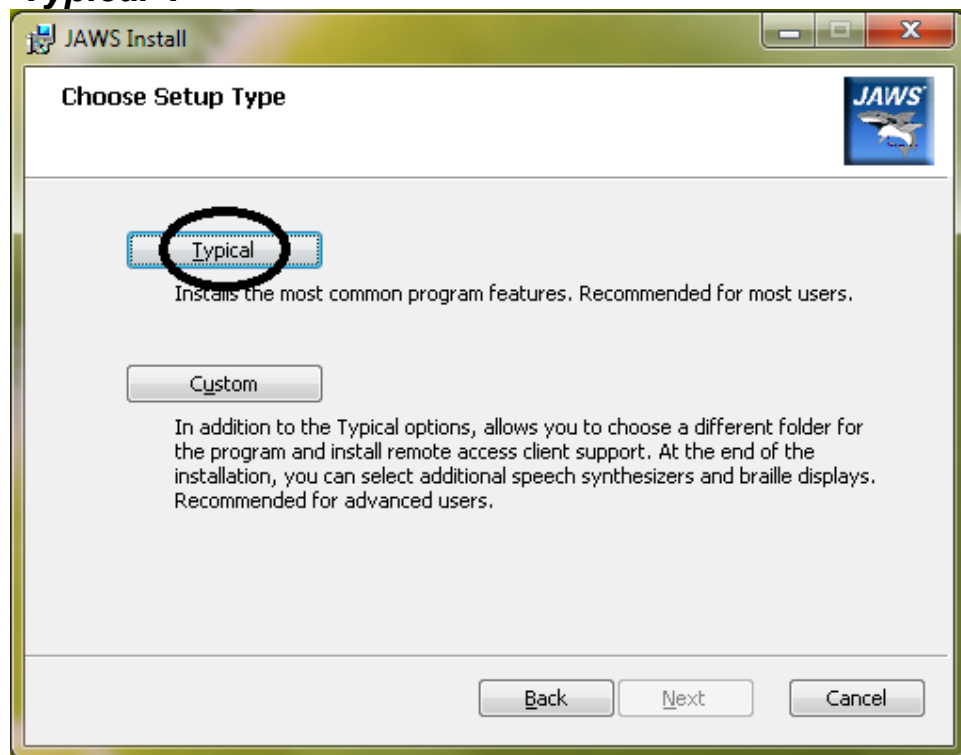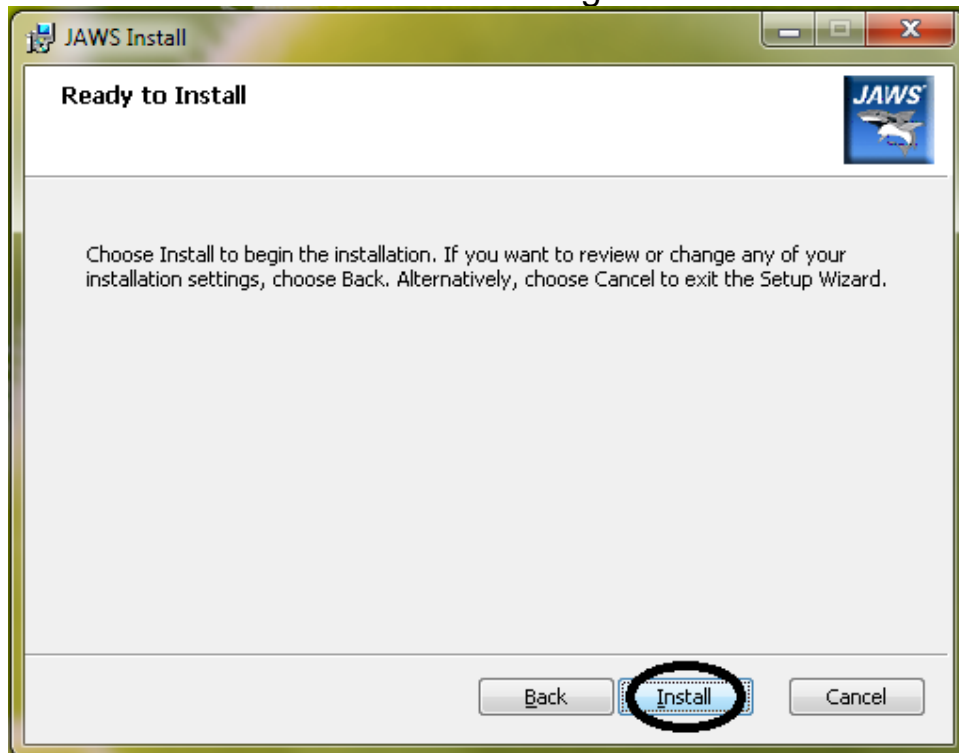

6. Click on "**Next**".

Check off the box for the License Agreement and click on "***Next***".

7. Click on "***Typical".***

8. Click on "*Install"* and the installation will begin.

9. Click on "**Finish**" to complete the installation.

10.   Although installation of the software is complete, JAWS Client still needs to be authorized in order for the program to function properly.
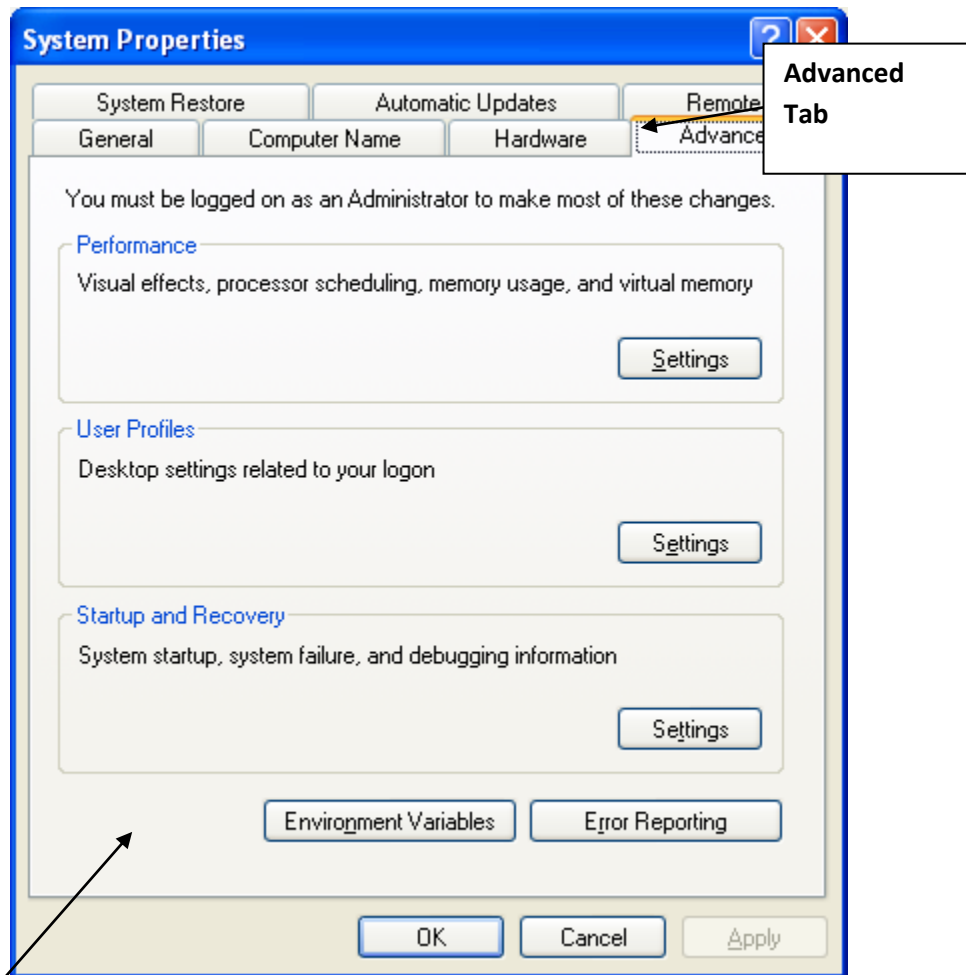
Authorizing JAWS Client

After the initial installation of JAWS on a client, you will need to configure the client to see the license server.

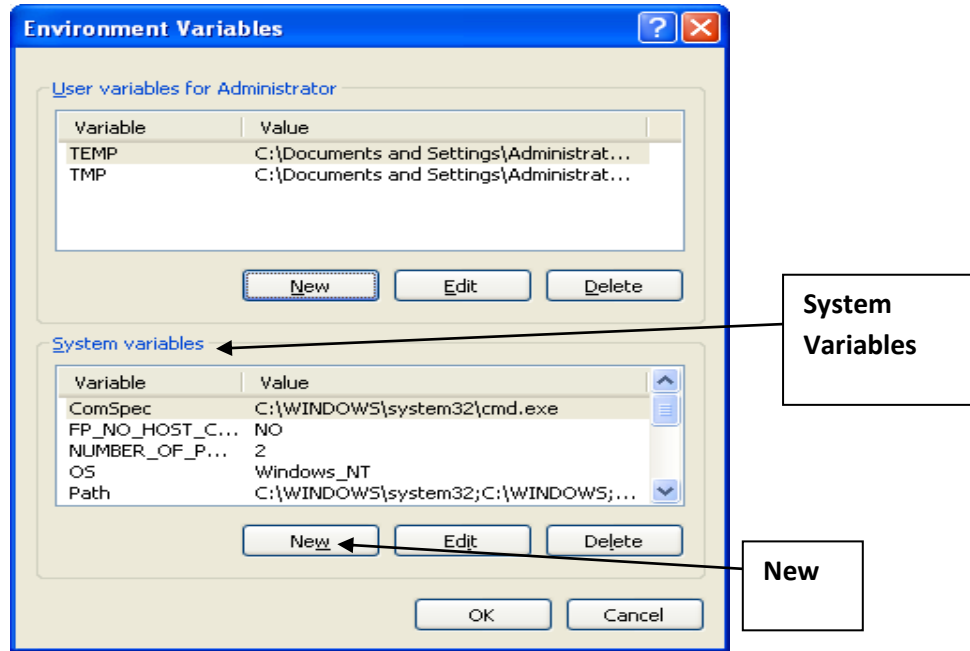1. On the client machine go to **Start → Control Panel** and open **System Properties**
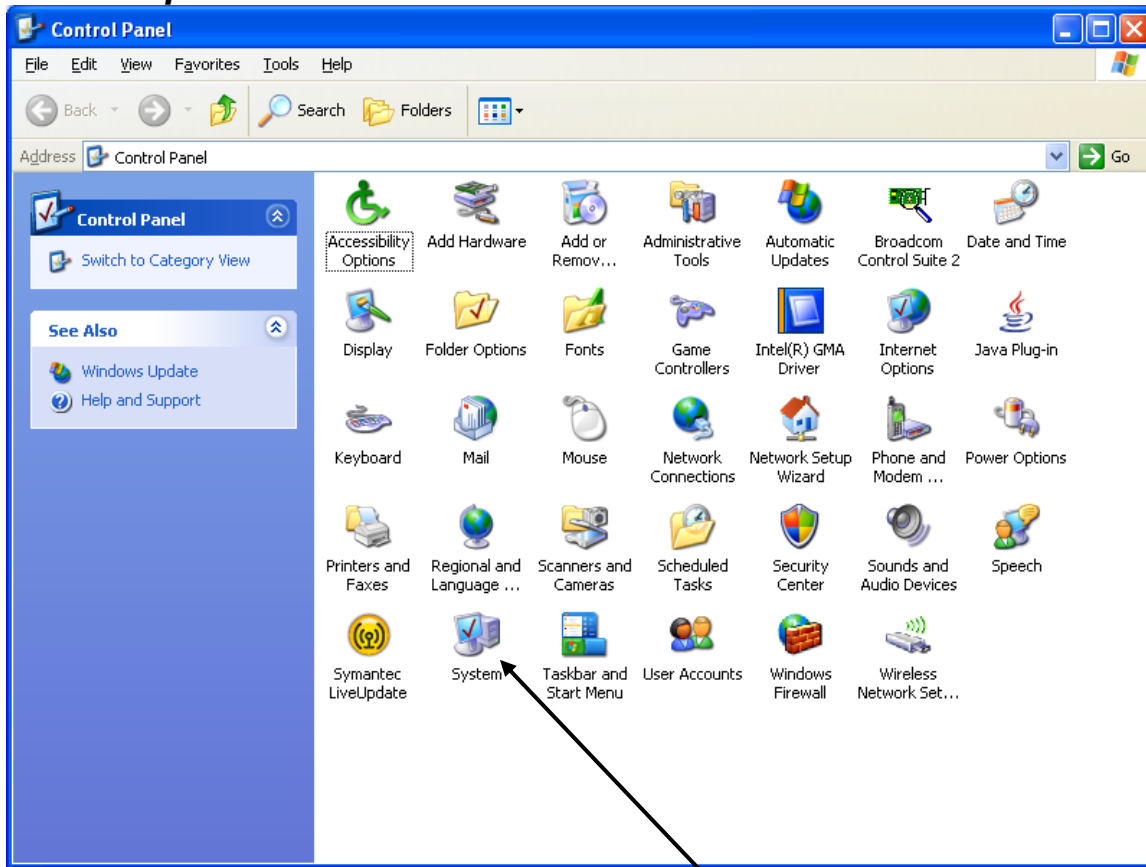
System

Properties

2. In the **System Properties** interface will appear. In the **Advanced** Tab click the **Environment Variables** Button.
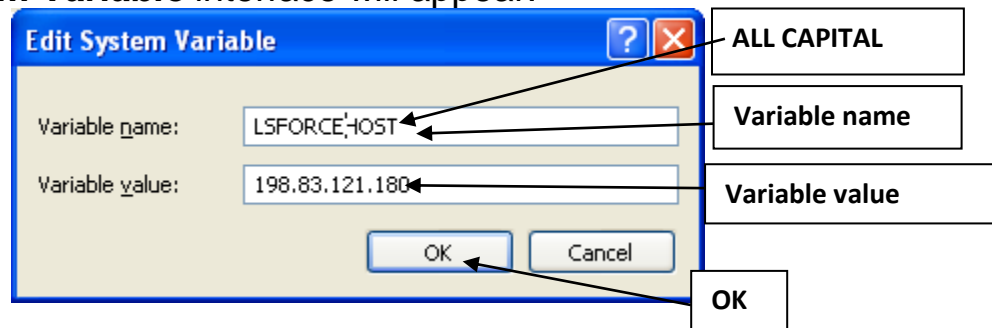
3. When the *Environment Variables* Interface opens, click on the "*New*" button under System Variables.

4. The *New System Variable* interface will appear.

5. Fill in the fields with the appropriate information for the license server you are trying to connect to. Then click "*OK*"

Variable Name: LSFORCEHOST ← LSFORCEHOST (All capital letters) is used to access an external license server.

Variable Value: 198.83.121.180 ← Value should be the IP address

Of the license server housing your JAWS license

198.83.121.180 is the CATS server.

OCR, Kurzweil 1000 and Open Book

OCR or Optical Character Recognition software allows a user to turn a flat document into an editable digital file. You can turn written reports into typed word documents that can be proofread and develop pictures into digital files that can be edited. This type of software is recommended for students with print impairments, learning disabilities and for audio output of printed materials.

Open Book converts printed documents or graphic-based text into an electronic text format on the student computer. Using OCR technology Open Book converts the document into text-speech. Open Book can be used by both blind and low-vision students.

For a blind student Open Book have many shortcut keys and speaks everything as it is selected. The student can control the program with there keyboard.

There are many features a low-vision student can utilize. They can manipulate font style, size, character spacing, and color. The student can also use masking and word spotlighting to help them follow text as they read. Open book also have a highlighting feature which allows the student to highlight important passages then it can be exported into a new document. Open book also uses the Pearl scanner which is very portable and can scan 20 pages per minute.

K1000 enables students who are unable to see a computer monitor to read, write and edit material by having it read aloud by the computer and then using keystrokes to navigate all the formatting commands. Material is opened from a word document, accessible .pdf , or flatbed scanner within the program. The file is OCR and converted into a .kes file for audio output. K1000 is recommended for blind.

Using keyboard shortcuts and audio output it helps guide the student in completing their desired goal. In comparison to K3000, K3000 has additional functions, like highlighting specific words being read which wouldn't benefit someone with limited visual capabilities. For this reason K1000 is the better suited for students who have severe visual disabilities, while K3000 is recommended for students with low vision but can still follow along with the computer screen.

CATS support and provide technical help and assistance for this AT which includes, usage, and troubleshooting.

Large Print

Large Print Calculators

The large print calculator has all the same functions as a regular calculator with the advantage of larger keys making it easier for students with low-vision to be able to see the buttons more clearly.

Large Print Keyboard

The large print keyboard is designed to have a larger font size on the keys of a keyboard so that low-vision students can see the keys better on the keyboard. There are also keyboards that have larger keys as well as having a larger and bolder font size on the keys.

Talking

Talking Calculator

For a student who is more visually impaired, there are also talking calculators which also have all the functions of a regular calculator with the advantage of speaking as you press on the keys and will speak out your final calculation.

Talking Dictionary

The talking dictionary helps improve a student's reading and writing skills by speaking out the definition of the word. This is beneficial for students with learning disabilities because it helps them understand reading passages better by giving the definition of the word and also the correct pronunciation.

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Mobility and Hand Function Disabilities

Mobility

Voice Recognition (Dragon Naturally Speaking)

Voice Recognition software which allows the user to express their thoughts and writing with great ease. It also allows the user to work virtually hands free when creating a document, accessing data, or working on the web. Dragon provides automatic transcription of voice, voice mails and web audio contents. This makes it easy for anyone to use the computer and allow users to communicate comfortably in any way that it works for them. By using a microphone it helps the student it helps the students control their computer easily without the use of a mouse or keyboard.

Keyboard with Key Guard

These keyboards are designed for students with limited motor skills. It is purposely designed to support the hands and press the desired keys through the key guard holes over individual keys. Students with limited motor skills may have trouble typing the correct keys on a standard QWERTY keyboard, resulting in misspelled words or grammatical errors. A key guard will help lower the frequency of these types of errors.

Joystick Mouse

This type of mouse has all the functionality of a traditional mouse but uses a joystick that requires minimal hand movement for precise cursor control without fatigue. This type of AT is also recommended for students with limited motor skills.

Trackball Mouse with Key Guard

This piece of AT has all the functionality of a traditional mouse but uses a trackball that requires minimal hand movement and a key guard to help users isolate on the buttons.

Height Adjustable Tables

Height adjustable tables should be strategically placed throughout a campus to ensure that any student with a wheelchair has access to a workstation they can have access to. Any classes that have a student who is in a wheelchair should have a designated workstation for that student.

Benefits

Each of the aforementioned AT is suited for students with mobility and hand-function disabilities. This is why assessing a student is important because maybe a student has tried some of these ATs before and it hasn't worked for them or maybe they never heard of it at all. Knowing what a student is comfortable with and what is working for them and not working for them will help in deciding the right AT for them. Students with limited motor skills can use Dragon NaturallySpeaking to control their entire computer with their voice rather than a traditional mouse and keyboard which may be difficult or impossible for them to use.

Hearing Disabilities

Pocket TalkerP

The pocket talker is an AT device that helps improve the hearing capabilities for students who have trouble hearing from a far distance. It also helps improve speech understanding, it's simple to use, is portable and lightweight. It is also compatible with telecoil-equipped hearing aids.

Turbo Ear

Turbo ear is similar to the "Pocket Talker" in that it is a personal amplifier to help students with hearing disabilities to be able to more clearly hear what is being said in a classroom. Turbo Ear has a more sleek design and is smaller than the pocket talker making it even easier to carry around. It is also a cheaper alternative to the "Pocket Talker". The one downside to its compact design is that it doesn't have a range feature so if a student is too far from the speaker, the sound quality may not be as clear.

Sign Language

Sign Language is primarily used for deaf people who are capable of understanding signing. This language consists of hand shapes, orientation and movement of the hands, arms or body and facial expressions to express the individual's thoughts.

Signing benefits students by making it easier for them to communicate and interact with other people. This makes it easier for them to interact with teachers and participate in classroom discussions.

Remote Captioning

Remote CART (Communication Access Real Time Translation), more commonly known as "Remote Captioning" is when a captioner is in a remote location and is receiving audio feed and provides captioning (streaming texts along with video text being broad casted over the internet). Whereas most people are aware of closed captioning it differs from remote captioning because closed captioning translates after the event.

C-Print

C-Print is a type of remote captioning. C-Print is a speech-to-text system. It's an accessible communication service option for the deaf and hard of hearing. C-Print helps improve the classroom experience for the deaf and hard of hearing.

A certified C-Print captionist is skilled in text-condensing strategies by using an abbreviation system, which reduces keystrokes. The text can be viewed to one or more students in different ways, such as including additional computer (laptops) or display monitors. The function of captionist is to include as much information, by providing a meaning-for-meaning (not verbatim) translation of the spoken English content.

C-Print Pro software is designed for speech-to-text, which allows the captionist to input text using keyboard abbreviation and or voice. The text can be electronic or in paper so the student can use it as notes.

This new software has taken note taking to the next level. It now helps students by enhancing the educational experience for students both in the classroom and during studying time. These tools are available when a student has access to a second laptop. The two methods for inputting text are; keyboard abbreviation system and by voice.

Skype

Skype is another program that can be used for remote captioning. A great benefit of skype is that not only is it free but you can use it wherever you have internet access (WiFi and LAN). There is no need for networking or any complicated set up process. You can also use Skype on your cell phone, depending on your network coverage certain plans allow you to use this application on their network without connecting to WiFi. This allows users to communicate by video, voice (if needed) or instant messaging via the internet. This can benefit students because they can have video conferencing as well as file transfers. This allows students to stay engaged in the lecture without getting lost in translation.

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