CSCI 1210
Essentials of Web Development

Links and Images

Links

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Essentials of Web Development

Links

What makes the Web the Web

One of the things that makes the web unique is hyperlinks, or 'links'

Changed the way consumers interact with content

No longer a linear, start-to-finish activity

Users can follow a 'breadcrumb trail,' jumping from site to site, or to different locations within a site to find the content they want

The Anchor Element

<a>

This tells the browser that whatever appears between <a> and is a link to another location

By default, links are displayed blue in color and underlined

Links

Let's think about this for a second

We use **`<a>`** to specify a link

That's great

Now what?

Well, if we're going to tell the browser to go somewhere when the user clicks on a link, it'd be nice if the browser know where it is we want the user to go

Where to go? -- **href**

This is one of the places we need to add an attribute to the opening tag

```
<a href="https://www.csci1210.com">CSCI 1210</a>
```

Will display like this

[CSCI 1210](https://www.csci1210.com)

Where to go? -- **href**

href == "hypertext reference"

This is an HTML-speak way of saying "address"

Tells the browser where to go when the user clicks the link

Remember, we talked about attributes a couple of lectures ago

They provide the browser with additional information to make the page behave the way we want

href - Two types

There are two types of hypertext references -

An absolute URL - points to another web site (like
href="http://www.example.com/default.html")

A relative URL - points to a file within a web site (like
href="default.html")

* We can also link to an element with a specified id within the page (like href="#top")

Other protocols (like https://, ftp://, mailto:, file:, etc..)

`href` - Absolute

An absolute reference provides the entire URL to the browser

(Remember what 'URL' means)

The address is a unique 'point' on the web that doesn't change

Easy to distinguish from relative URLs because of "http://" (or "h

Any text here

```
<a href="https://www.csci1210.com">CSCI 1210 Website</a>
```

href - Relative

A relative reference provides the location of a resource with respect to the location of the current page

The browser starts "looking" for the requested resource at the lo... that the page is stored on the server

So, here, the browser will check the "labs" folder for another sub... named "lab1" and a file named index.html

Any text here

```html
<a href="labs/lab1/index.html">Lab 1</a>
```

Making an Internal Link

Internal Link

Link within your own website

Relative URL may (*should*) be used

The pathname can be used to specify the location relative to the location of the current document

Navigating the File Tree

If you think of your computer's file system as a tree, you'll see that there are several big branches (main folders)

…smaller branches (sub-folders)

…and leaves (files)

Any of the branches can have 0, 1, or many leaves
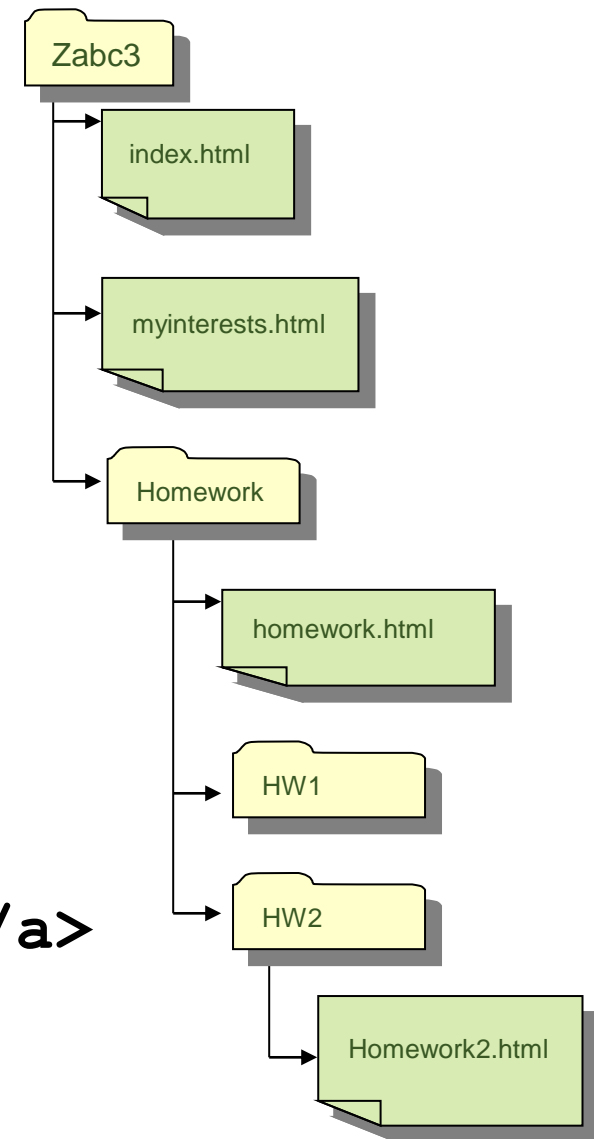
Making an Internal Link

If the file you are linking to is:

Within the **same** directory:

Only the filename is necessary

Ex. Linking **to** MyInterests.html **from** index.html

`<a href="myinterests.html">My Interests</a>`

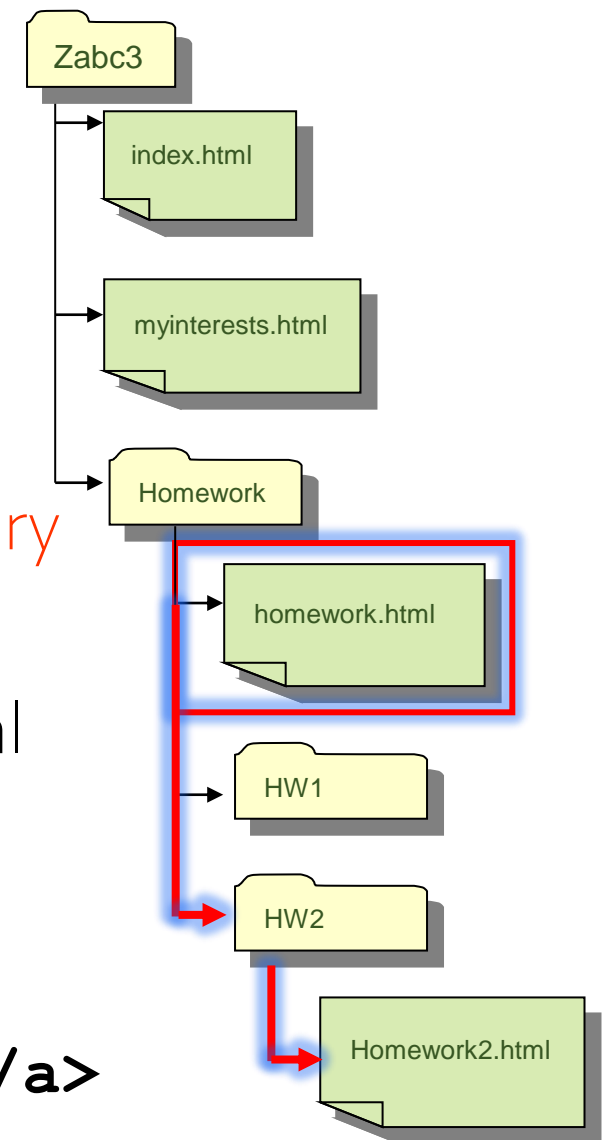# Making an Internal Link

If the file you are linking to is:

Within a lower directory

Pathname, including the directory will be necessary

Ex. Linking **to** homework2.html **from** homework.html

Notice, no '/' in front!

```
<a href="hw2/homework2.html">Homework 2</a>
```

Zabc3

index.html

myinterests.html

Homework

homework.html

HW1
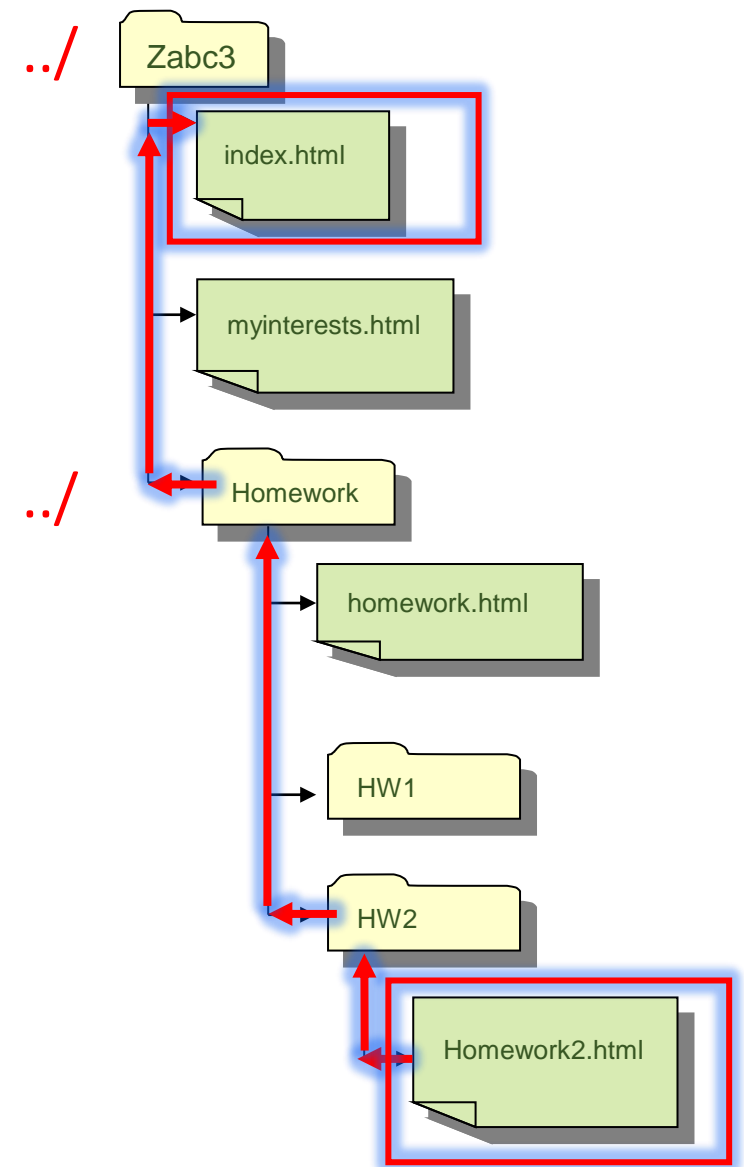
HW2

Homework2.html

Making an Internal Link

If the file you are linking to is:

Within a **higher** directory

../ must be used to "back out" of a directory

Ex. Linking **to** index.html **from** homework2.html

`<a href="../../index.html"> Home </a>`
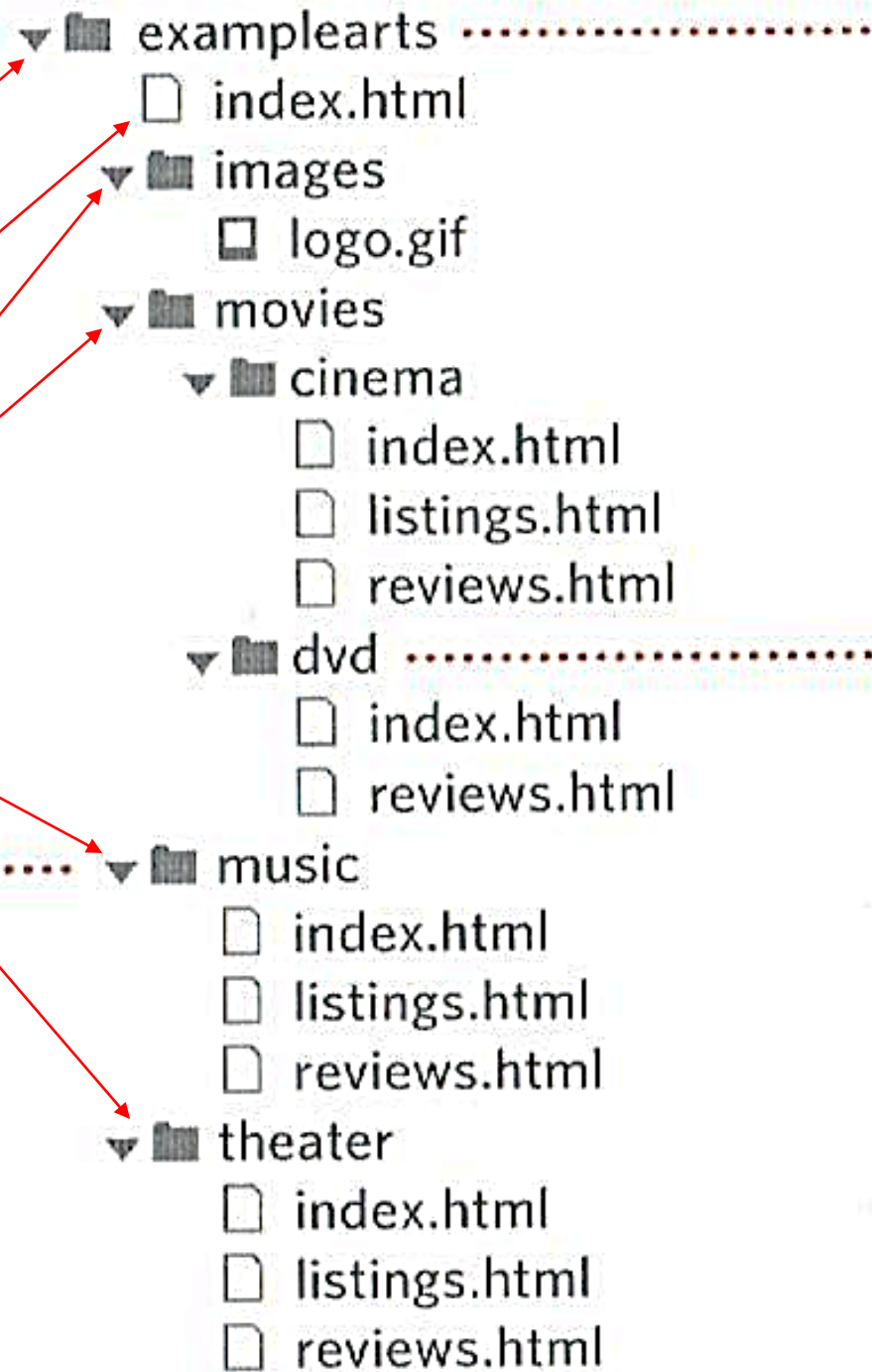

../ Zabc3

index.html

myinterests.html

../ Homework

homework.html

HW1

HW2

Homework2.html

PARENT

The *examplearts* folder is a parent of the *music* folder.

GRANDPARENT

The *examplearts* folder is a grandparent of the *dvd* folder.

CHILD
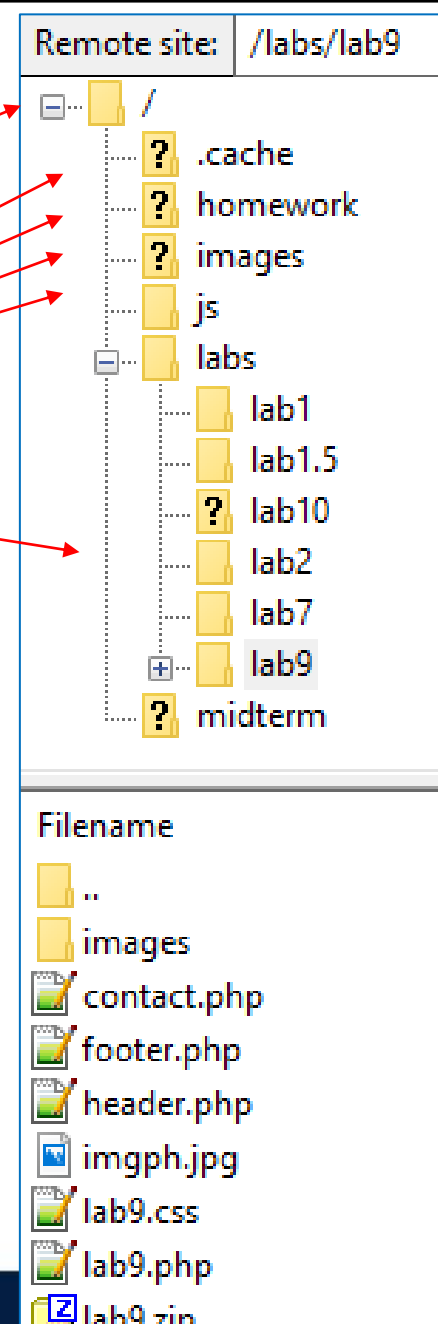
The *music* folder is a child of the *examplearts* folder.

GRANDCHILD

The *dvd* folder is a grandchild of the *examplearts* folder.

'WEB ROOT'

LANDING PAGE

SUBFOLDERS

▾ examplearts
　□ index.html
　▾ images
　　□ logo.gif
　▾ movies
　　▾ cinema
　　　□ index.html
　　　□ listings.html
　　　□ reviews.html
　　▾ dvd
　　　□ index.html
　　　□ reviews.html
　▾ music
　　□ index.html
　　□ listings.html
　　□ reviews.html
　▾ theater
　　□ index.html
　　□ listings.html
　　□ reviews.html

File Structure Navigation

```
+ csci1210.com
|
+---assignments
|    |
|    +---hw4
|    |      hw4.html
|    |      hw4.zip
|    |      hw4template.html
|    |
|    +---css
|    |        hw4.css
|    |
|    \---images
|              001.jpg
|              002.jpg
|              003.jpg
|              004.jpg
|              005.jpg
|              006.jpg
|              007.jpg
```

✔ This is the output from the DOS 'tree' command, which shows a listing of folders, subfolders, and files in each folder for a given directory.

It also illustrates how files and folders are arranged in relationship with one another

Making an Internal Link

Why would you want to use relative links in a website?

Why not just use all absolute links in a website?

What happens when you have to move your website?

Absolute vs. Relative URLs

Two reasons to use relative URLs instead of absolute

Absolute URLs can take longer (DNS lookups)

What if you have to move your site to a new provider, server, or domain?

The rule is: If you're linking to any resource on your site, use relative URLs; Any other site, use absolute URLs

Making a link within a page

This will cause the user to be sent to a certain section within the same page

Naming a **fragment** (section)


```html
<h1 id="top">Top of Page</h1>
```

Linking to a fragment

...

```html
<a href="#top">Top</a>
```

Note the use of the # here

Making a link within a page (Example)

Go to bottom of page

.
.
.

<p id="footer">This is the bottom</p>

Will Display →

Go to bottom of page

.
.
.

This is the bottom

Mail Links

mailto: command

Allows the browser to open a new mail message addressed to the e-mail address indicated

Ex: `<a href="mailto:dokesj@whimsey.com">Email Joe</a>`

Email Joe

For mailto: to work, the client computer has to have a default email client

It isn't used much, if at all, anymore

Links Summary

Provide a way for users to navigate to resources within and outside a site

HTML anchor tag, Link

href = "hypertext reference"

Inside a site, use relative links

Outside a site, use absolute links

Use relative links whenever possible

Path is important

Images

Essentials of Web Development

CSCI 1210

Images

Obviously, images are an important part of the Web experience

The old saying, "A picture is worth a thousand words" is still true, as much for the Web as anywhere else

Knowing how to make a raw image suitable for use of the Web is a critical skill for a developer

First, let's look at how to add an image to a web page

Then, we'll see how we can take raw images from the camera to the web page

Images

`<img>`

This is a standalone, inline element

Like the **`<a>`** element, we have to provide the browser with a little additional information to make it work

Attributes:

src specifies the source or URL for the image (Required)

alt specifies alternative text (Required)

title specifies the title for the image (Optional)

`<img>` – src, alt, title

```
<img src="images/globe.jpg" alt="globe picture" title="globe picture">
```

The attribute src identifies the source URL for the image.

This can be expressed as either an absolute or relative URL (and behaves in the same manor as the attribute href on the anchor tag)

Images – src, alt, title

The attribute **`alt`** defines the alternative text

- This is important for those with visual impairments using browsers that "read" the page

- In some browsers, if you hover over the image, the alternative text will appear.

- Required attribute for validation

The attribute **`title`** defines a title for the image. Works similar to the alt attribute

Images – types of images

There are three basic formats of images: GIF

Graphics Interchange Format

Smaller File Sizes

Supports only 256 colors

Not very good for photos

Good for logos, icons, cartoons, etc

Can have transparent backgrounds

Can be animated (…and potentially annoying)
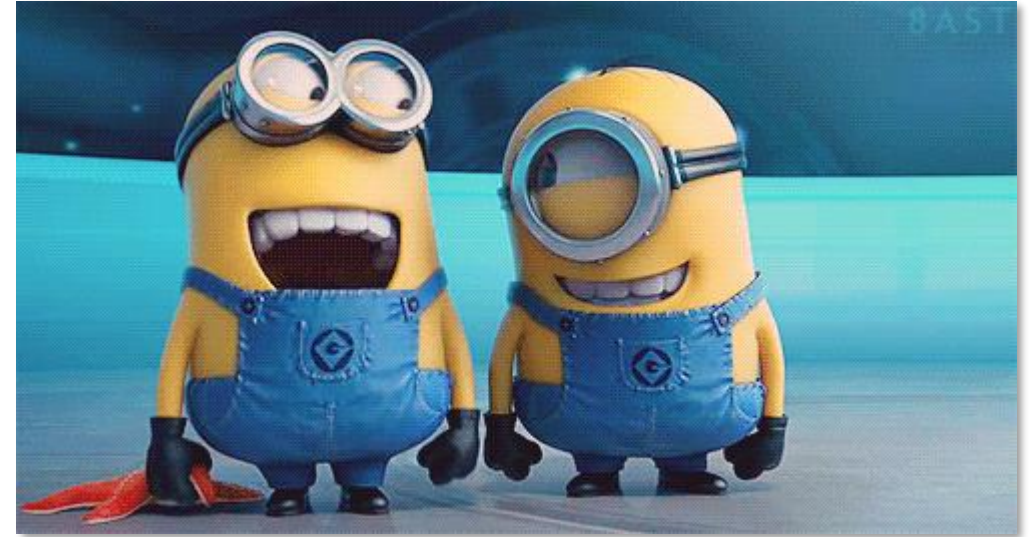
Images – types of images

There are three basic formats of images: JPG / JPEG

Joint Photographic Experts Group

Lossy Compression

Smaller file sizes

Supports 16+ million colors

Good for photos

Good (but not ideal) for logos, icons, cartoons, etc

Cannot have transparent backgrounds

Cannot be animated

34 KB

Images – types of images

There are three basic formats of images: PNG

Portable Network Graphics

Lossless Compression

Larger file sizes

Supports 16+ million colors

Good for photos (can be larger file sizes vs jpg)

Good for logos, icons, cartoons, etc

Can have transparent backgrounds (PNG-24 and PNG-32)

Cannot be animated
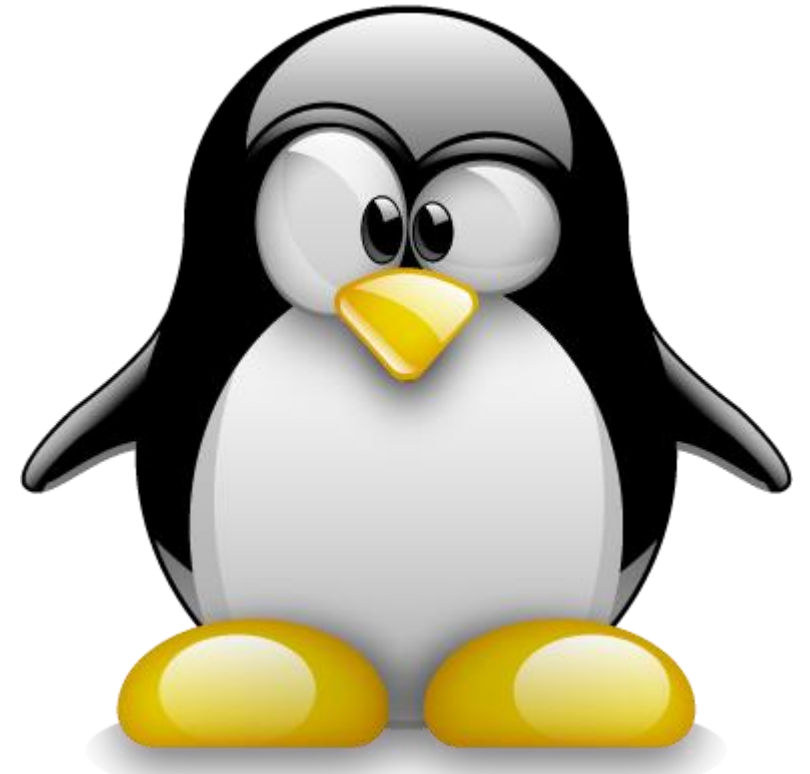
Captions

`<figure>`

Sometimes, we want to include captions for our images

The **`<figure></figure>`** element makes this possible

`<figcaption>`

```
<figure>
    <img src="images/globe.jpg" alt="globe picture">
    <figcaption>Glass Globe</figcaption>
</figure>
```


Glass Globe

Image Links

Instead of using text for a link's display, we can use an image

```
<a href="https://csci1210.com/index.html" target="_blank">
    <img src="images/etsulogo.png" alt="etsu logo">
</a>
```

See here, the **`<img>`** is nested inside the anchor

We'll do a lot of nesting in this class

Notice, also, **`target="_blank"`**

Image Links

```
<a href="https://csci1210.com/index.html" target="_blank">
    <img src="images/etsulogo.png" alt="etsu logo">
</a>
```

Resolution

Resolution refers the number of pixels per inch the graphic contains

The standard resolution for the Web is 72ppi (pixels per inch). For printing a picture, the standard resolution is 300ppi

So why not use 300ppi for web graphics?

Two words:

File Size

Resolution

Many users still connect through dial-up

3G/4G/5G (mobile phones) are faster, but still a lot slower than cable/fiber

"Slower" broadband (cough, cough) - Satellite

File size of images is the most significant factor in page load time

Resolution

According to a the Pew Research Center, 3% of the entire United States still connects to the world wide web via a dial-up connection. That's more than 9.4 million Americans (https://www.pewresearch.org/internet/chart/broadband-vs-dial-up-adoption-over-time/)

% of adults who have internet access at home

Dial-up   Broadband
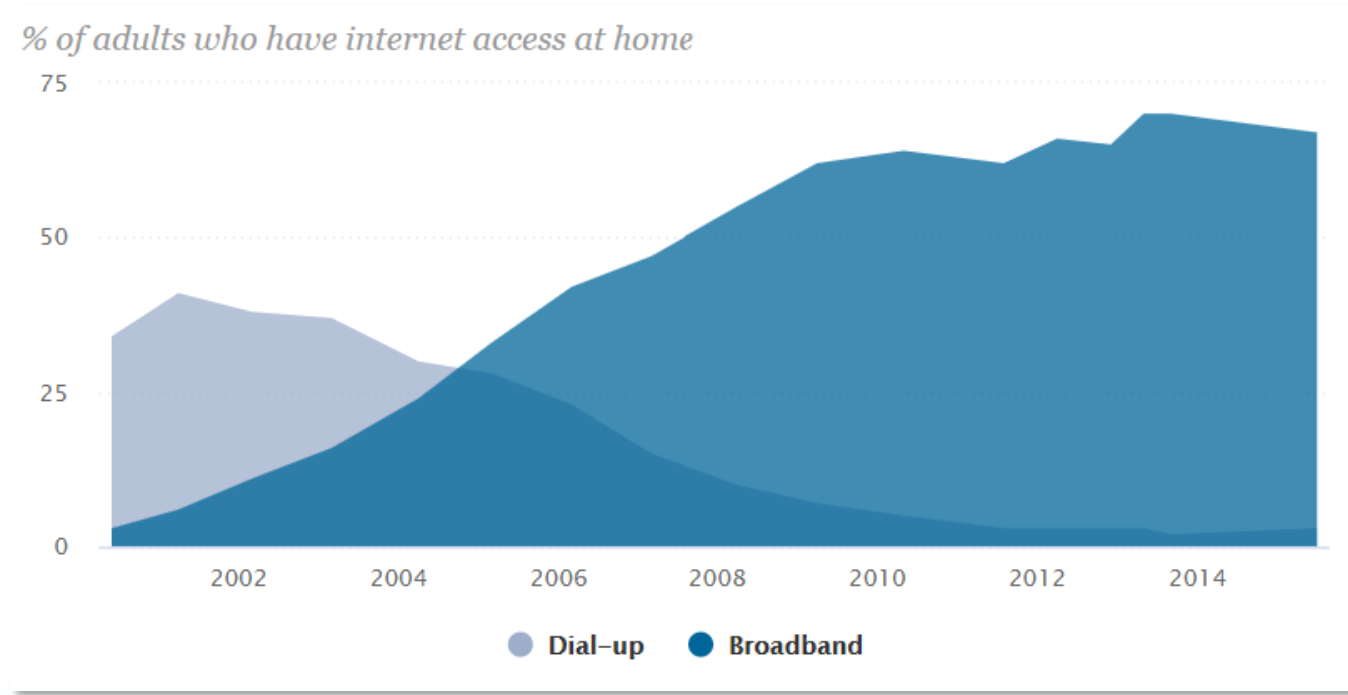
Resolution

Since browsers cache recently accessed files, you can save your users download time by always loading the same graphic files from the same location

Example: If we use the company logo on every page of our website, it would be better to use one logo and every page access the same logo from the same location on our server

* "cache" means that the computer stores a local copy of a downloaded file for a while so if you revisit a site, it doesn't have to download it all over again

Resolution

The Browser Cache
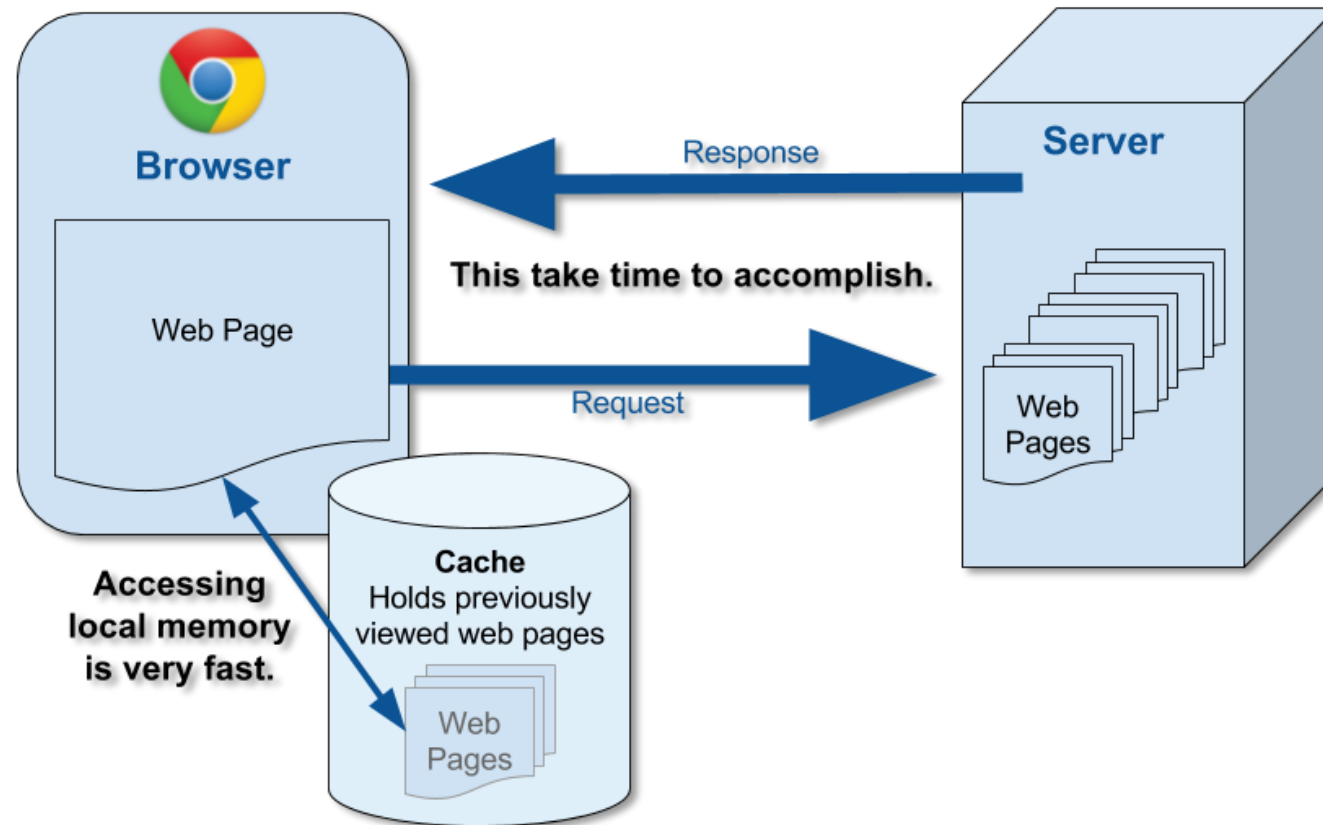
Resolution

While caching helps page load times, the files still have to be downloaded the first time the page is accessed

It's important, then to optimize images for the Web

By 'optimize,' we mean edit the files so that their resulting file size is as small as possible without losing resolution

Page download times are the most important factor in overall user satisfaction with a site

Photo Editing Basics

Photo Editors

Most cameras – even cell phone cameras – take pictures that are way too big for web pages

Such photos should be edited to reduce their size before being posted to the web

Web services such as Facebook and Instagram to this automatically when files are uploaded

Adobe - Best photo editor (not free)

GIMP - Just as good (according to users - free)

Optimizing Photos

Several ways

Cutting out unimportant parts

Resizing

    Resolution

    Dimensions

Increasing compression ratio (JPEG)

Welcome to GIMP
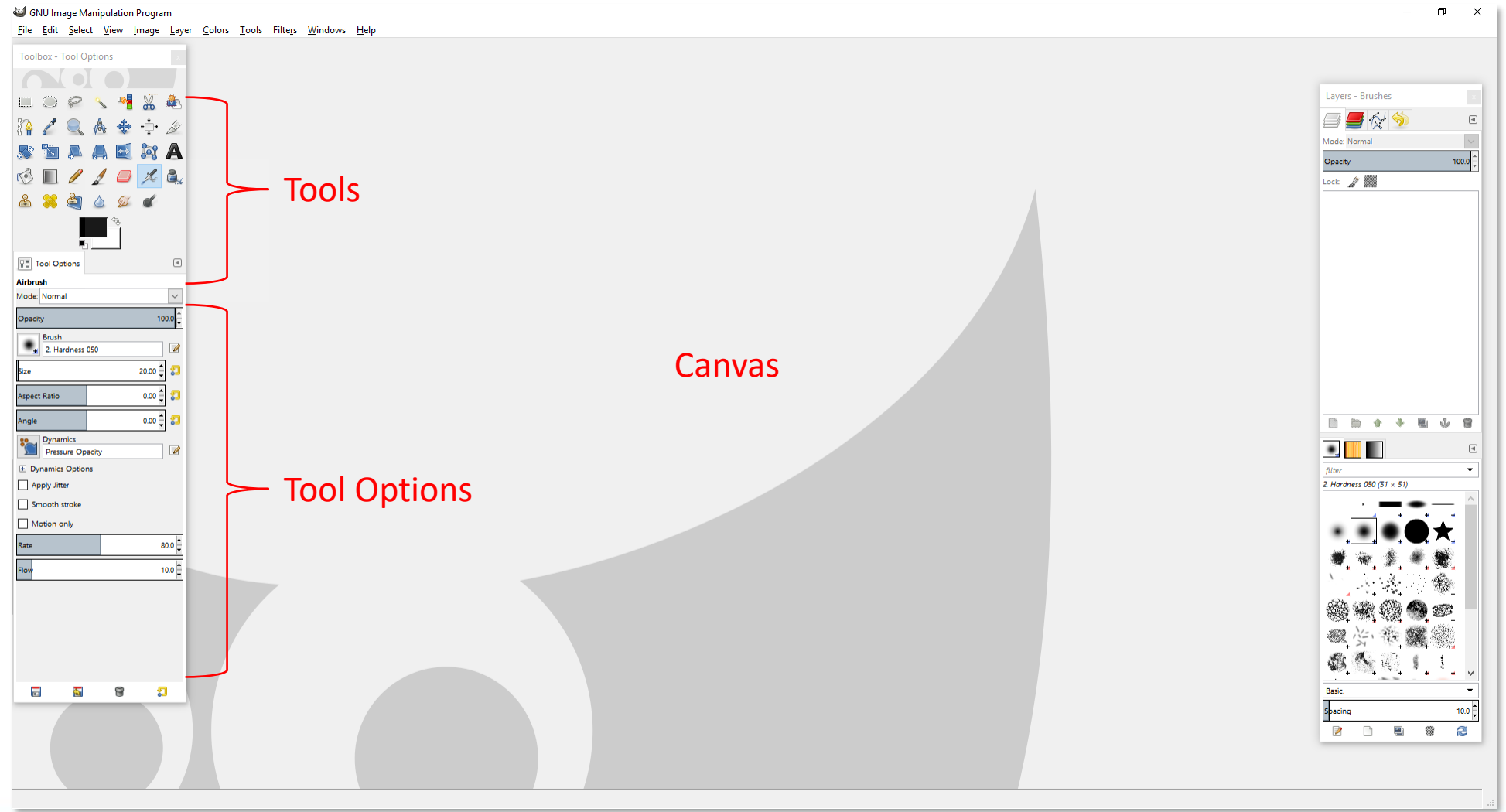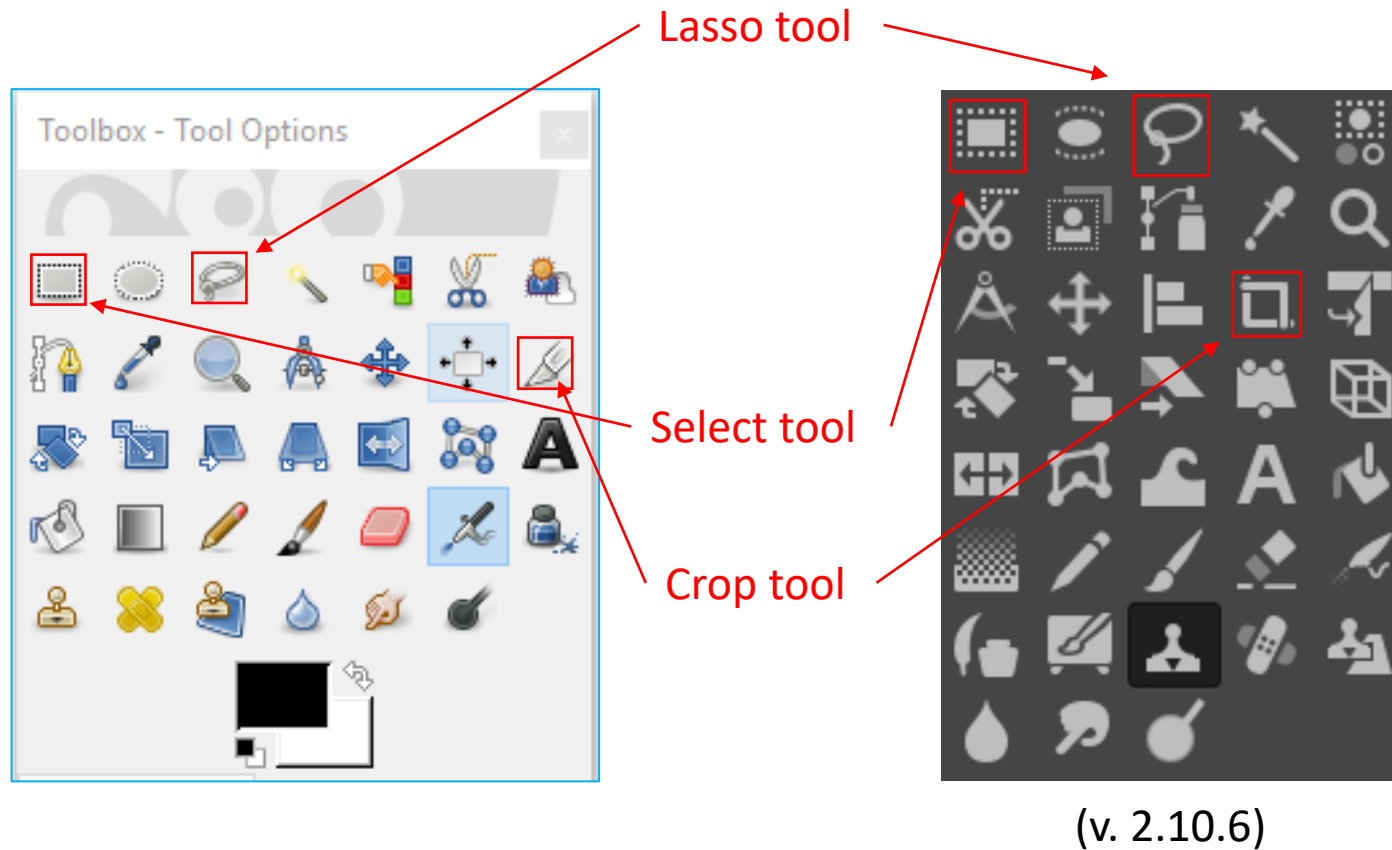
Tools

Tool Options

Canvas

Welcome to GIMP

Lasso tool

Select tool
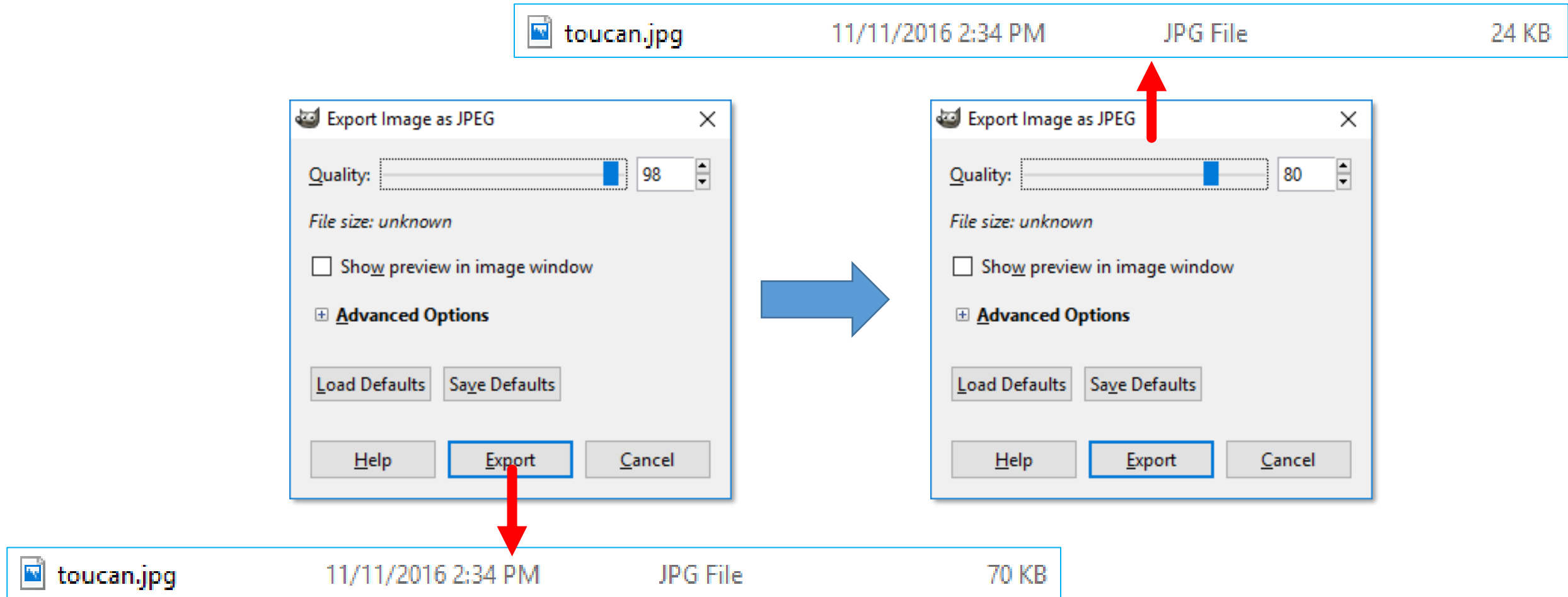
Crop tool

(v. 2.10.6)
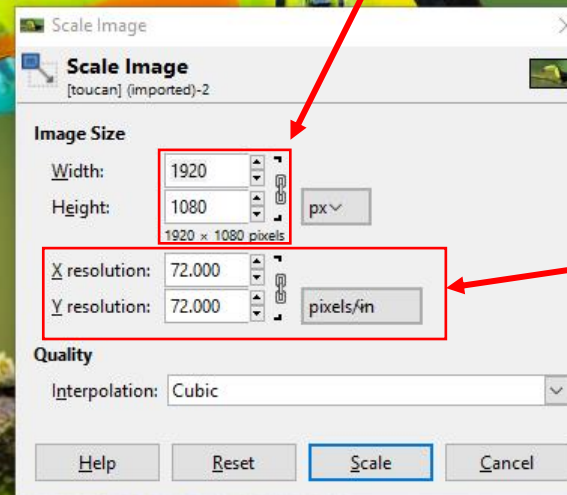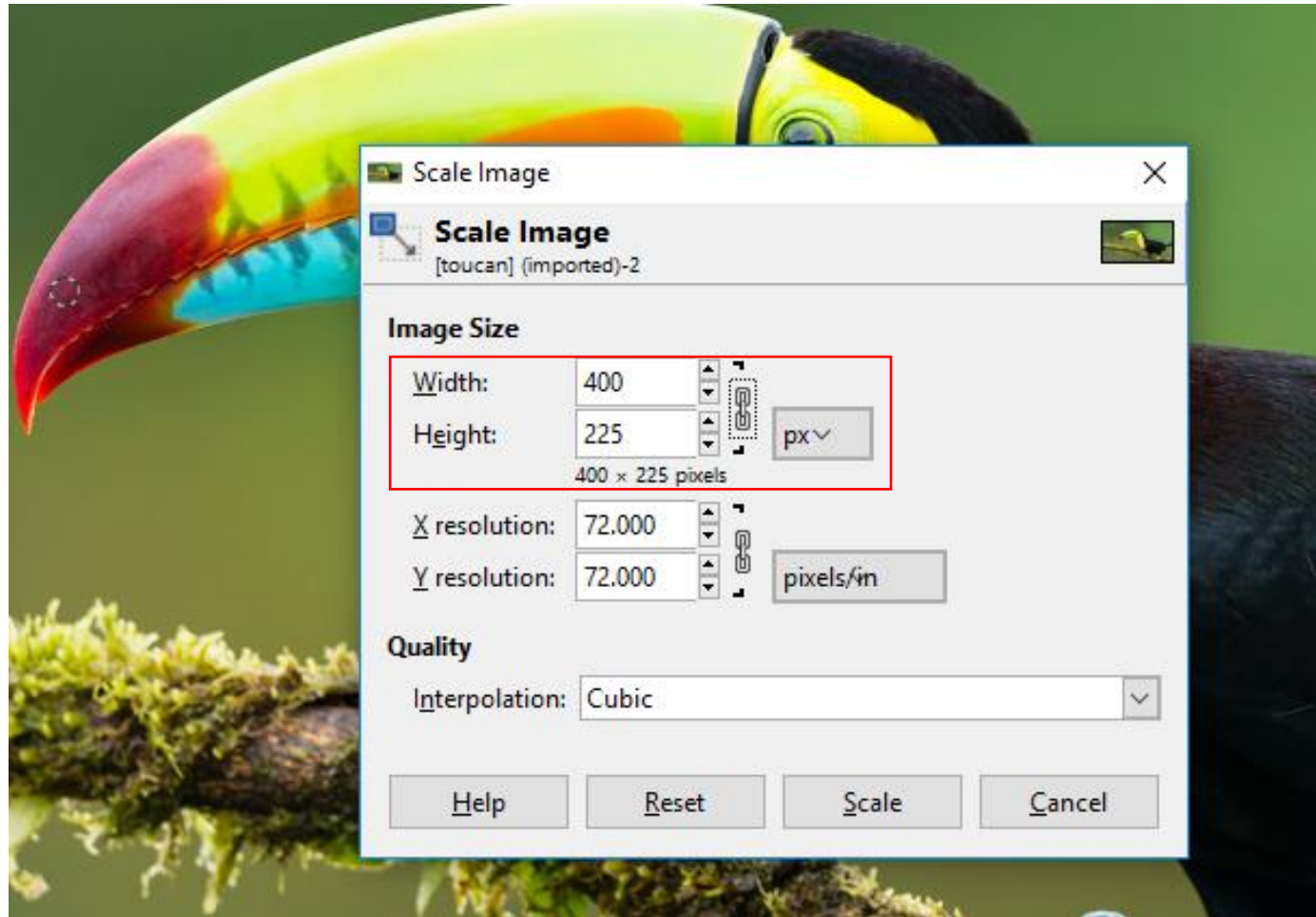
Web Images - Resizing
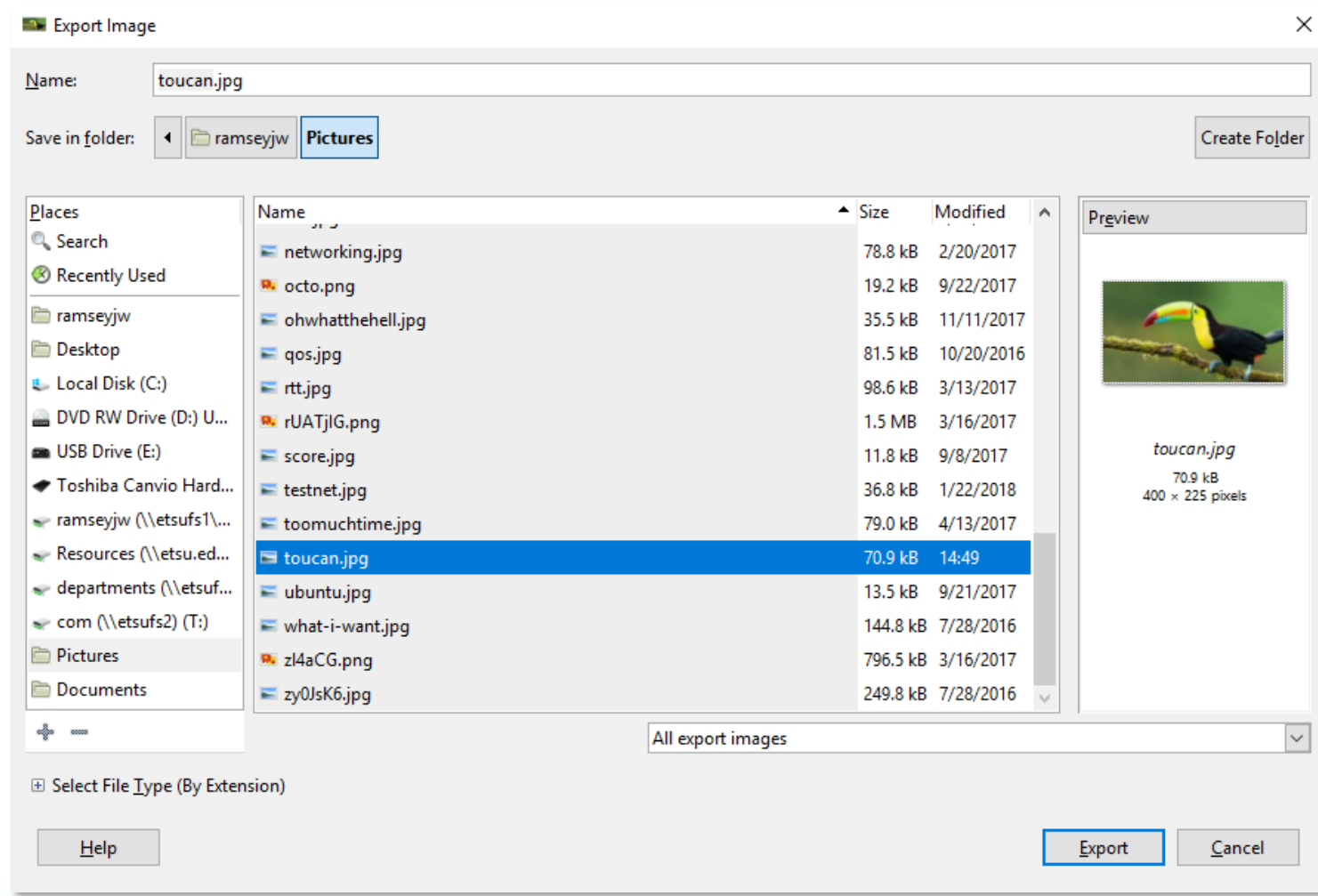
Web Images - Resizing
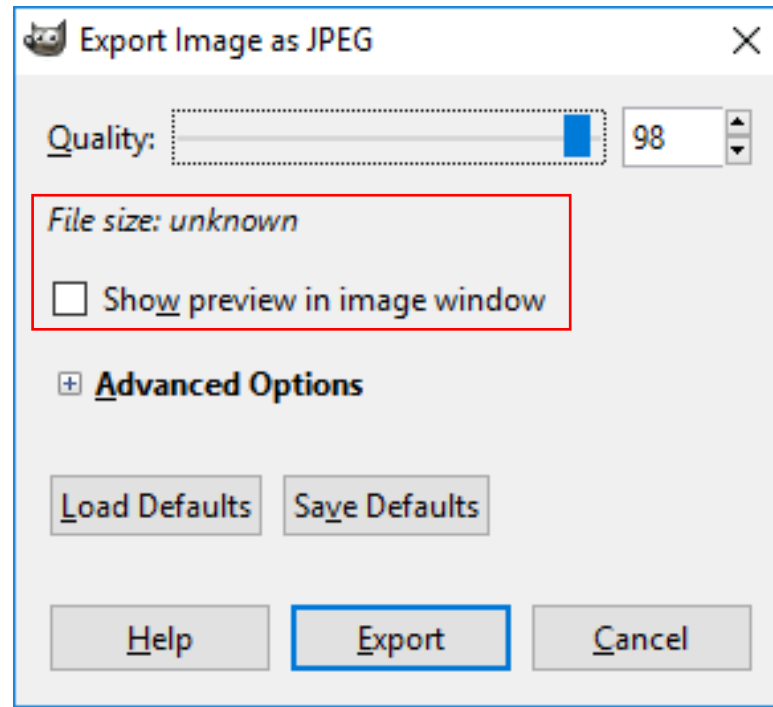
Web Images - Resizing

Web Images

By modifying the image's resolution, dimensions, and compression ratio, the file size went from

552,000 bytes

to

24,000 bytes (!)

That's 4.3% of its original file size

But still displays fine on a web page!

Very important, particularly with mobile platforms

Cropping

Another way to modify images, and present them more creatively, is cropping

Often, images will capture more than a photographer really wants to include
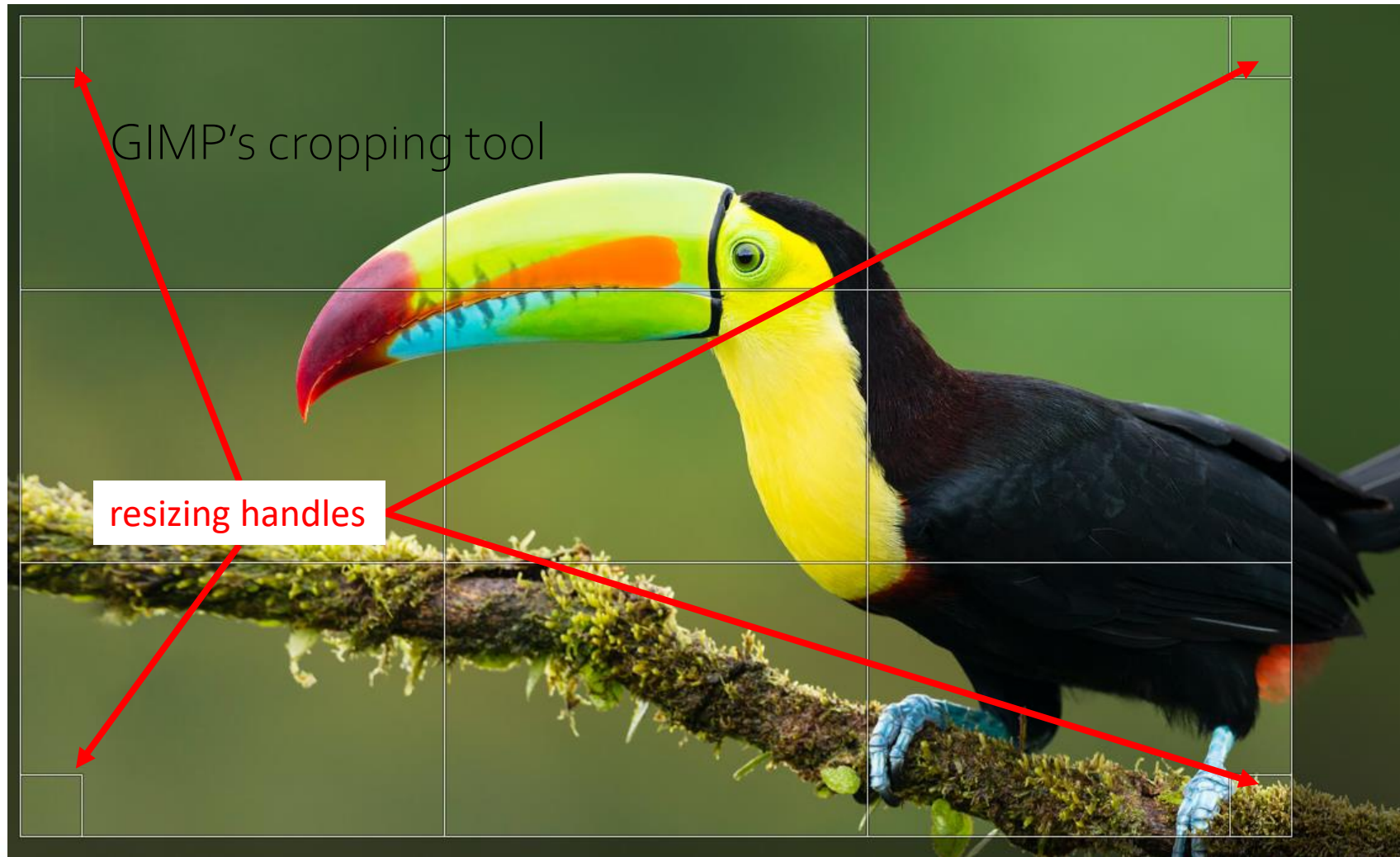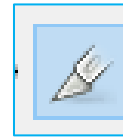
Cropping allows the photographer/image editor/web site designers to include only the content that is desired

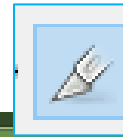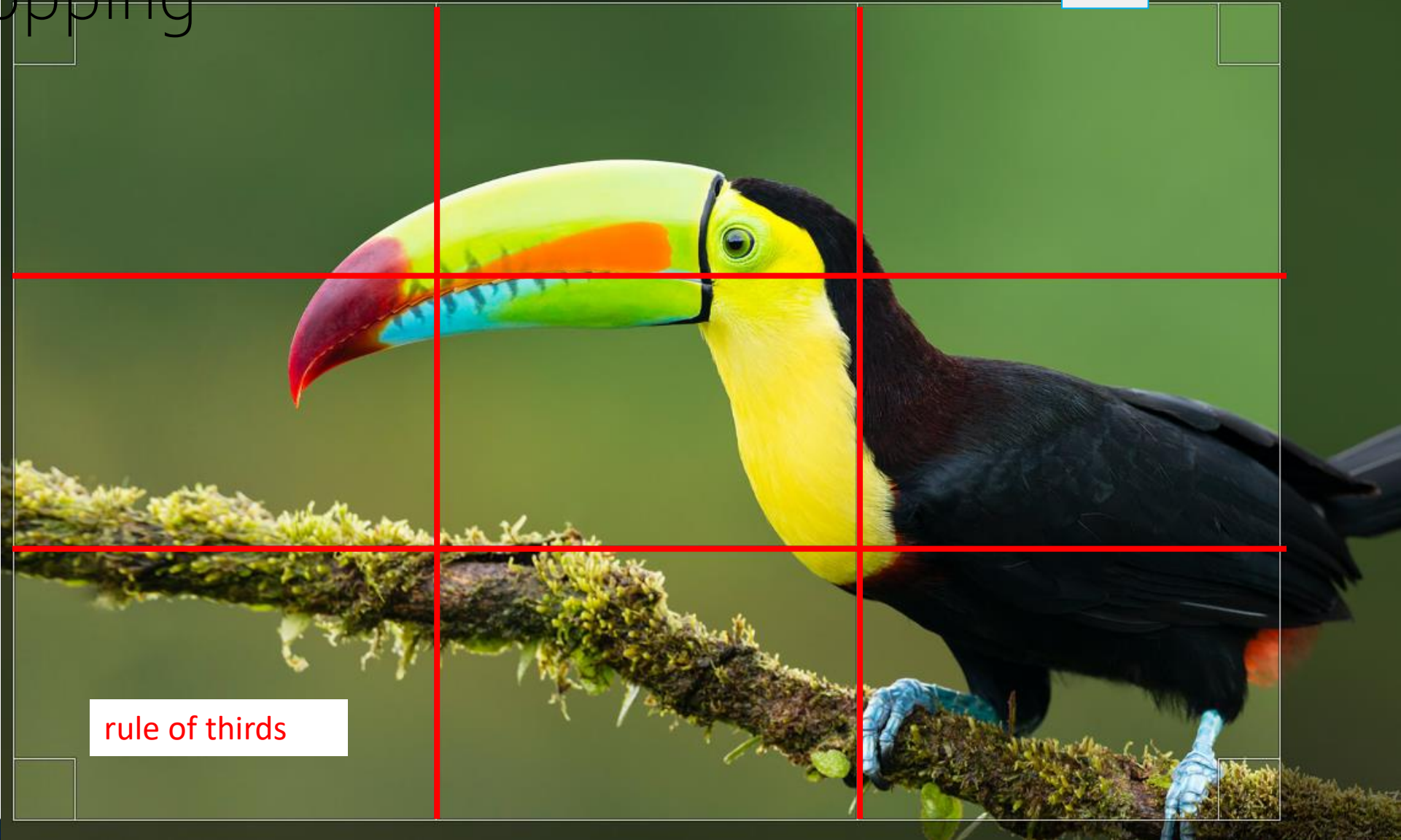Typically, when I frame a photo, I zoom out a little to give myself a little "wiggle room" artistically

Also, along with resizing, changing dimensions, and modifying the compression ratio, cropping will further serve to reduce file size

Cropping

GIMP's cropping tool

resizing handles

East Tennessee State University
Department of Computing

CSCI 1210
Essentials of Web Design

Cropping

rule of thirds

Cropping

Double-click to crop – file size goes from 58M to 26M

Photo Editing

We'll cover the mechanics of resizing, cropping, and compressing images in lab

It's much the same with Photoshop

Again, this is the bare basics of photo editing

Enough, though, for optimizing for the web

Web Design Lifecycle

Targeting Users & Requirements Gathering

Targeted Site Users

Users

Every well designed site has a targeted set of site users

Cannot create a site that appeals to everyone

Profile of targeted users based on site mission and goals of site owner

Define groups of targeted users to focus design

Once we know who to target, we can plan what content and design will (and won't) appeal to them

Will often create user personas to aid in planning

Users

Information can come from:

   Customer's company marketing department

   Sales / marketing employees

   Existing web site analysis

   Surveys and research of existing customer base

Any other ideas?

Creating User Profiles

What groups of people will visit this site if it is successful?

Build a set of different group profiles along with identifying elements

May want to create a persona — describing a hypothetical site user and his/her interests—for each targeted group

Creating User Personas

Who will visit this site?

What do they have in common?

Interests?

Goals?

Likes / dislikes?

Turns the abstract concept of "user" into a person with thoughts and emotions

Helps you know who you are designing for

How a user persona works

Represents a group of users with similar goals and characteristics

Helps you get to know users more closely to create better experiences

Example Persona

Joan Perez

age: 26
residence: Columbus, OH
education: Bachelors Degree
occupation: Teacher
marital status: Single | No children

My students come first in everything I do.

Joan is a new teacher, having recently gotten her certification from a teacher placement agency. She is in her second year of teaching now, starting to get the hang of things more, but also now realizing how much she needs to improve. She wants to get better, but also wants to be smart about it.

Comfort With Technology

INTERNET

SOFTWARE

MOBILE APPS

SOCIAL NETWORK

Criteria For Success:
To see all of her students grow 1.5 grade levels.

Needs
- Mesaureable impact
- To have project self manage

Wants
- Something that doesn't take long to setup
- Products that integrate with other existing technology

Values
- Student growth
- Time savings
- Products that easily fit into her current workflow

Fears
- Cutting into already sparse free time
- Starting something that isn't sustainable
- Doesn't actually improve student achievement
- Someone else has already built what she needs

Example Persona

Sean Perkins

age: 33
residence: Washington, DC
education: Bachelors Degree (BA)
occupation: Business Owner
marital status: Single | No children

I think this idea could work, I just need to put more energy into it.

Sean is juggling many projects and priorities. He appreciates help from his vendors and employees. When tackling something new he prefers to do some research then consult an expert.

Comfort With Technology

INTERNET

SOFTWARE

MOBILE APPS

SOCIAL NETWORK

Criteria For Success:
When a project achieves its goals on time and on budget while delighting users.

Needs
- Tangible results
- To have project self manage

Wants
- Start small
- See results before spending more money

Values
- Detailed planning
- Concrete expectations
- Decisions backed up by analytics or data

Fears
- Failure
- Wasting money
- Being too hasty

User groups

Sites often exist for more than one type of user

We can group these users according to characteristics they have in common, but which distinguish them for other groups

Example - A university web site:

       Faculty/staff
       Students
       Prospective students / parents
       Alumni

Site focal user groups - Common elements:

Age ranges

Gender (one dominant?)

Education level

Occupation

Hobbies and interests

Experience level—computer and/or Web

Personal goals

Equipment used (desktop, laptop, PDA, cell phone, etc.)

In-class Activity

You've contracted to design a web site for an auto parts store

What distinct groups of people might visit this site?

For each group, identify one overall characteristic/concern that distinguishes that group from others

Maintenance Flow Chart
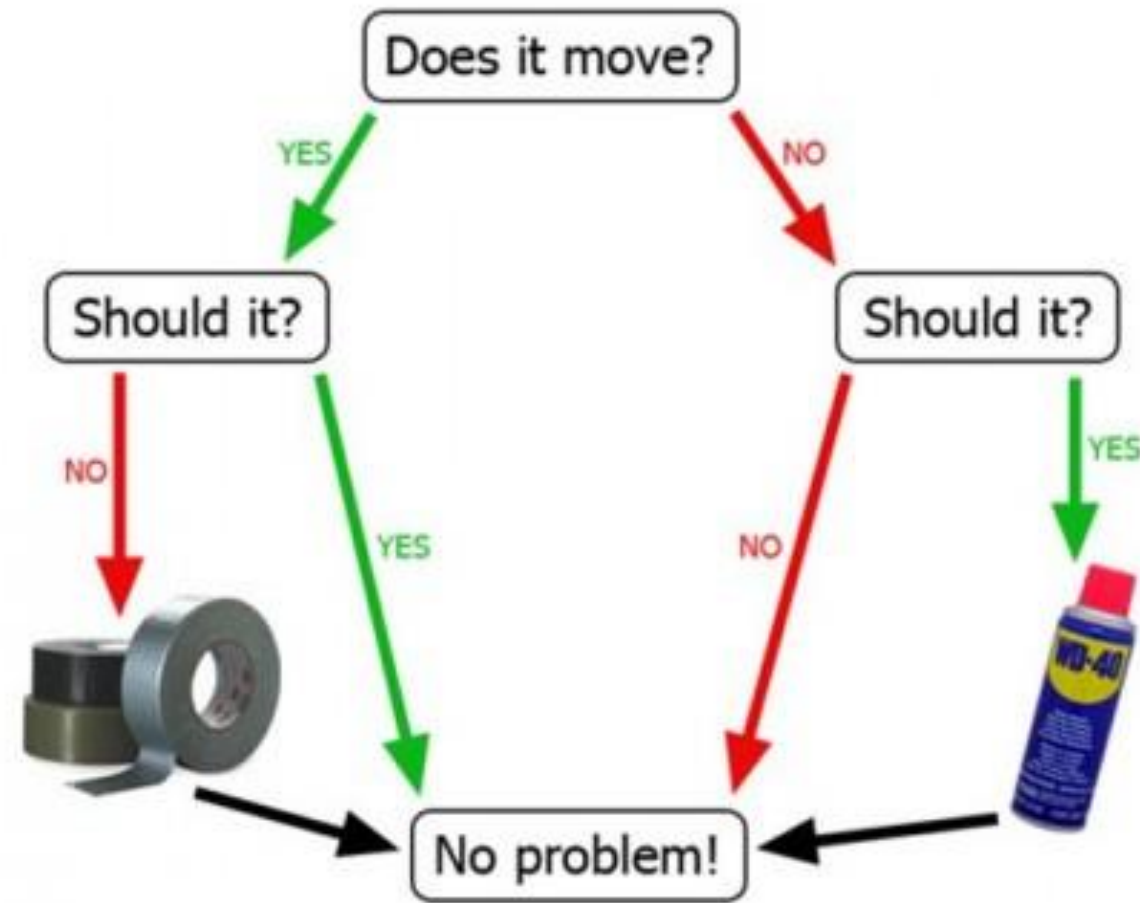
In-class Activity

Car parts site design—example user groups:

Professional car mechanics

Hobbyists and car enthusiasts

"Do It Yourself" car repair people

Suppliers and resellers of components

In-class Activity

Mechanics

Use: Search inventory by part number and availability

Major concern: Delivery speed

In-class Activity

Hobbyists

Use: Search by make/model/ year; getting the right part

Major concern: Getting the parts they want

In-class Activity

DIY

Use: Finding parts by pictures / tutorials

Major concern: Price

In-class Activity

Did anyone notice anything peculiar about the preceding three photographs?

That's right! They were all male

While it is not safe to assume that no women are interested in cars or are professional mechanics, I think we can agree that it is primarily the domain of men

Prioritizing

Oops! Did we forget one? What about resellers?

Creating user profiles or personas helps us to know who to target (and who *not* to target) in our design

May be helpful to rank or prioritize different groups

    Although component resellers might be interested in visiting our site, our hypothetical client is not particularly interested in dealing with them, so we're not going to incorporate them into our design. So we can omit them from the design process

Remember, the *designer* is not making the decisions. The designer is working with *client* to build user profiles and associated prioritization

Audience Splitting

May be possible to explicitly target different user groups and partition presentation relevant for each group.

http://www.etsu.edu

Benefits of Understanding Site Users

Building user personas and groups can aid in determining:

      Overall tone, personality, and attitude of site

      Organizational structure of site, navigation

      Text, terminology/jargon, writing style

      Appropriate pictures and graphics

      Functional features of site

Requirements Gathering

Requirements

Requirements: those elements that must be present in our final product to achieve success

General requirements may come from the designer, but specific requirements come from end users and customers

Requirements

Designer:

Site must have correct utility and be usable

My customer (site owner):

Site must allow the sale of products

Site end user:

Site must allow me to select products by browsing by color, style, product name, or size

User Requirements Elicitation

Requirements Analysis: process used to learn and understand the needs of our targeted users

What do they need/want to do?

Requirements Elicitation: discovering requirements by communicating with end users and others

User Task Analysis: determining *how* a requirements can best be implemented and supported in a design

Begin by determining *what* functionality needs to be supported. Then consider *how* it should be presented and accomplished

Collecting Scope Requirements through
- Questionniares
- Prototyping
- Group Activities
- Interviews
- User Observation
- Workshops
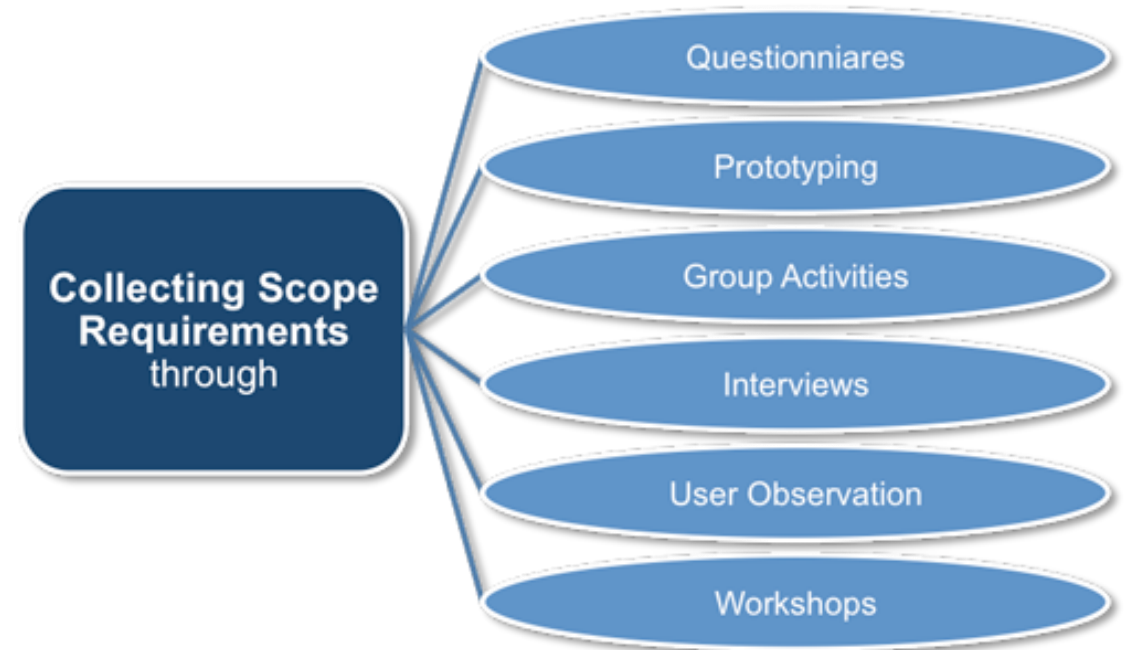
Requirements Elicitation

Designers do not determine site requirements, they gather requirements specified by others

Comes from meeting with clients and end users (when possible), and asking *specific* questions

Requires effort on the designers' part to learn requirements through skillful use of questions

Customer may say "I want an online store" but there are many different kinds and design alternatives

Users must be guided in the process of stating their requirements. They generally will not have thought through this in advance

Requirements Elicitation Techniques

Interviews and questionnaires

Ask *specific* questions to determine wants/needs

"What do you want?" may elicit general requirements, but detailed questions needed

Brain storming sessions

Meet with groups and discuss ideas and variations

Requirements Elicitation Techniques

Storyboards

 Diagram alternatives; discuss pros/cons and changes

Role playing

 Walk through particular requirement

Prototyping

 Produce rough drafts of potential "solutions" for examination

Types of Requirements

Specific requirements tie to functional demands or design attributes of the site

> *"Our company color is royal blue; we'd like that to be featured in the design"*
> *"We'd like site visitors to be able to chat with technical support via our site"*

General requirements can be derived from attributes of and knowledge of our targeted users

> *Since AARP site visitors are mostly older-aged, "flashy" presentation not valued*
> *Color contrast is important for readability*
> *Larger text*

Types of Requirements

These are ETSU's official colors

NAVY

Pantone 282 C

C100 M90 Y13 K68

R4 G30 B66

#041E42

Isacord #3355

Screen Print PMS 282

GOLD

Pantone 123 C

C0 M19 Y89 K0

R255 G199 B44

#FFC72C

Isacord #0800

Screen Print PMS 1235

In Class Exercise

You've been hired by Super Toyland Toy Store to create their new site. The customer has arranged for you to meet with a group of people who regularly shop in their physical store

What questions would you ask at this meeting to learn about these customers and their requirements? After the meeting with the customers you have a meeting scheduled with representatives of Super Toyland management to discuss the site

Work with a couple of neighbors to create a list of at least 4 questions for each of the meetings

Requirements vs. Site Mission Statement

Occasionally stated requirements may conflict with site mission statement

Can the requirement be met in a manner consistent with the mission statement?

Client/site owner must be made aware of conflict so they can decide how conflict will be handled

Questions

Lecture Quiz

1. Which element do we use to create a link?

A. <href>

B. <a>

C. <img>

D. <link>

Lecture Quiz

2. How are links displayed by default?

A. Like this

B. <u>Like this</u>

C. <u>Like this</u>

D. <u>Like this</u>

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3. Which two attributes are required for an **`<img>`** element?

A. src & alt

B. src & title

C. title & figcaption

D. alt & title

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4. Images can be used in place of text for hyperlinks

A.   True

B.   False

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5. Which image format is most likely being used for the following image?
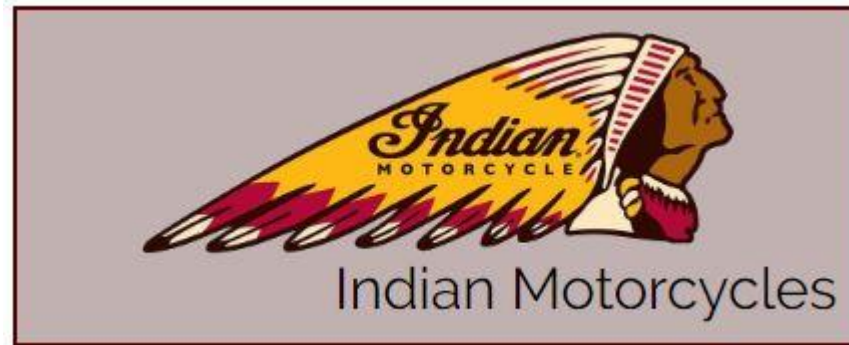
A. .bmp

B. .jpg

C. .svg

D. .gif

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6. Designers determine specific requirements

A.   True

B.   False

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7. A site mission statement is usually identical to an organization's mission statement

A. True

B. False

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8. What instrument/technique can we use to understand our site's users?

A. Persona

B. Surveys / research

C. Client's marketing/sales department

D. All of the above

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9. Which of the following is a user characteristic we would want to identify as we build personas?

A. Age ranges

B. Gender (one dominant?)

C. Education level

D. Occupation

E. Hobbies and interests

F. Experience level—computer and/or Web

G. Personal goals

H. Equipment used (desktop, laptop, PDA, cell phone, etc.)

I. All of the above

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10. What does the `target="_blank"` attribute/value pair do?

A. Makes a page launch in a new tab

B. Overwrites the current page with a new one

C. Nothing. `target="_blank"` is deprecated and no longer used

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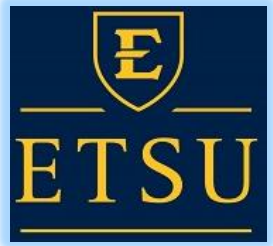
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