



ARACHNE

Arachne Part 5: Playtesting and Final Report

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1 Summary

1.1 What We're Proud Of

We all have our individual parts we're proud of. Andy is partial to his work on the login window, the first component in the game to look nice and make *Arachne* look like a game rather than a systems utility. Sulabh takes perverse pleasure in all the hacks he put in the code to outwit Java into doing what he wanted, as well as the crazy math involved in getting win checking to work. Marleigh is psyched to have one of her game ideas not only playable, but also cross-platform. She's also very smug about getting three undergraduate males to program a game that didn't involve explosions.

As a team, we're most proud of the fact that we have an original game, not simply a clone of something else.

1.2 If We Had More Time

If we had more time to work on *Arachne*, we would address the issues that came up in playtesting that we didn't have time to address (see §3.2.3 Future Work). Other things we'd like to do internally include:

- **Puzzle Creation:** It's slow, it dies on large pictures, and due to Java weirdness, we can't even tell the user what's going on. Adding some C precompiled libraries or some distributed puzzle generation over a network are some things we could look into.
- **Finish Graphic Design:** See §Figure 2: Graphic Design Changes. Left, original graphic design from P3. Right, screenshot from final version (P5). for pictures of how *Arachne* is supposed to look.
- **Fuss with Music:** It loops too much.
- **Second Round of Playtesting:** It's very hard to tell if the tutorial and help fixes are working without outside playtesters.
- **Improve Win Checking:** Right now, if you play with Filled Pieces, it's possible (but unlikely) to have multiple correct solutions to a puzzle. We'd like to add those as valid victories.
- **Clean Up Our Code:** It's amazing how documentation and good coding style doesn't seem so important at the end of term...

1.3 Thing We'd Do Differently Next Time

If we had this project to do again, with our 20/20 hindsight, things we'd do differently would include:

- **No Java:** Java had so many hang-ups, we spent lots of time just trying to find work-arounds rather than improving our game. Maybe Flash.
- **Everyone Learns to Code:** Our designer was required to go through a programmer to make all but very basic changes, frustrating both parties.

- **Fake 3D:** Weaving would be clearer if we could make the 3D nature of the pieces more apparent. It doesn't seem worth the overhead of making a 3D game, but it would be good to make the pieces look 3D.
- **Stick to Deadlines, Even Internal Ones:** We had some issues with team members not meeting deadlines, thus making the whole team have to work harder at the last minute.

2 Changes Since the Original – Recap

This section outlines the changes that have been made to *Arachne* between the original pitch and the alpha release of Part 4. The original development plan is included in the Appendix §4.1 Development Layers from Part 1.

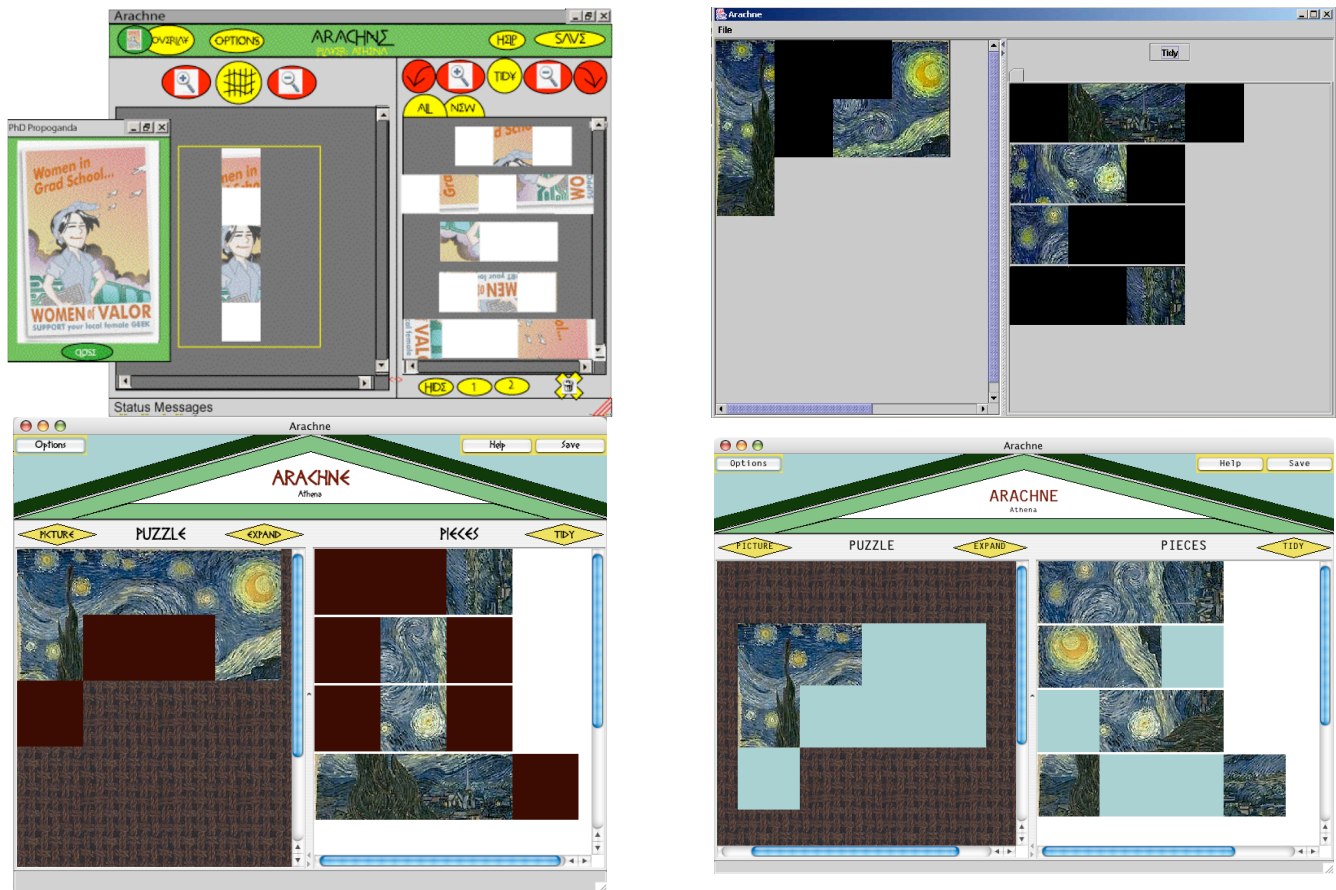


Figure 1: The Evolution of *Arachne*. Top left, original layout sketch (P1). Top right, screenshot from functional minimum (P3). Bottom left, screenshot from Alpha release (P4). Bottom right, screen shot from final version (P5).

2.1 Technical Changes

We made several changes to *Arachne* due to technical constraints or lack of time. One might even notice a trend, that more things were cut due to lack of time as the term progressed.

2.1.1 P2 – Design Specification and Interim Report

Since P2 was largely a design milestone, we hadn't hit any large technical problems yet.

2.1.2 P3 – Progress Report

- **Windows Only:** *Arachne* had several bugs which only occurred on Macs. To make life easier, we decided to work on Windows only and not fix Macintosh or Linux related bugs. Ironically, we changed our minds and decided to support Macs again between the P3 and P4 milestones.

2.1.3 P4 – Alpha Release

This is where the time crunch really hit us. We cut a great deal for this milestone.

- **All High Target Features Cut:** We all knew these were probably not getting in, we just made it official. Some features we would have liked to have gotten to:
 - **Expand / Contract Parts of the Puzzle:** Our rationale for this feature at the time was that expanding the entire puzzle takes a lot of space, so the ability to only expand the part of the puzzle you care about would have been nice. Since then, we've reconsidered this feature, and decided it doesn't provide much user benefit. Expand is really only helpful if you're looking for lost pieces, so there's not much point for expanding for more than a quick check.
 - **Zoom In / Out:** Good for working with small puzzle pieces, large puzzles (zoom out for an overview), and for examining details of a puzzle.
 - **Smart Tidy:** Currently we just line up the pieces in the sort bin in a semi-random order. Trying to keep pieces together that the user was grouping would have been helpful.
- **Picture Overlay:** This feature would have taken a picture of the final puzzle and lined it up with the pieces of a partially completed puzzle. It would have been a logistical nightmare for probably not much user benefit, so we took it out.
- **Graphic Design:** This was taken out due to lack of time. We did try to get some in, though clearly not as much as in the original design. The columns would have been difficult, and we didn't get to all of the custom diamond buttons.

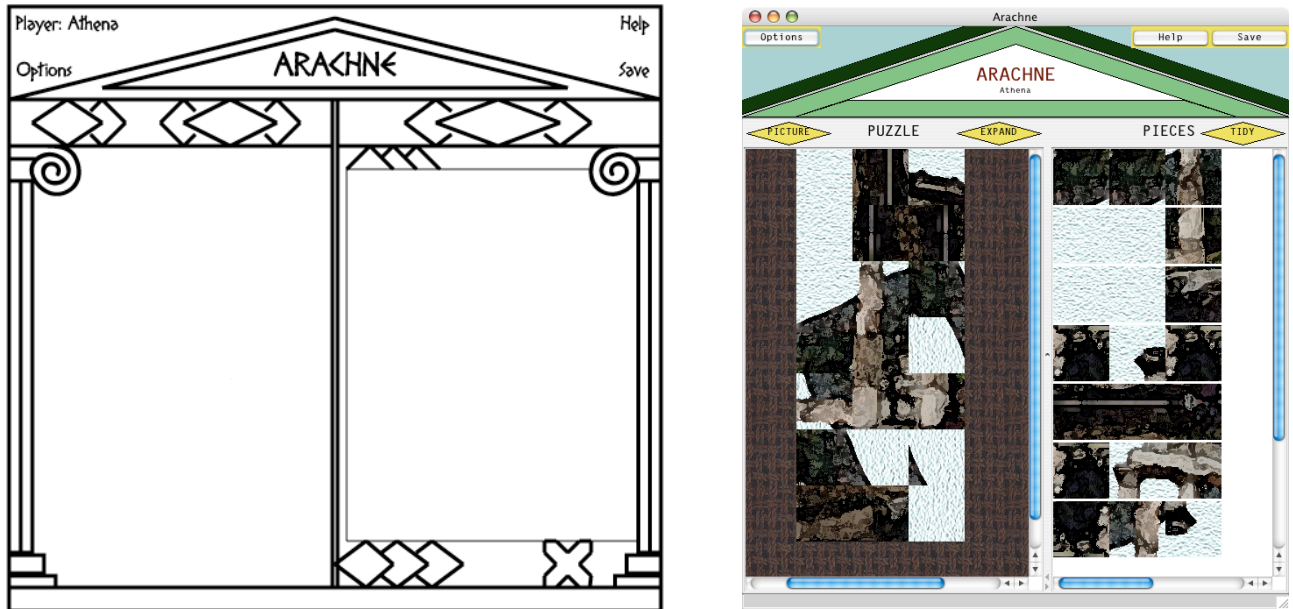


Figure 2: Graphic Design Changes. Left, original graphic design from P3. Right, screenshot from final version (P5).

2.2 Playability Changes

While most of our changes were due to wrestling with Java or lack of time, we did have some which we changed for design or playability reasons.

2.2.1 P2 – Design Specification and Interim Report

- **Sorting:** Both of our peer critique groups thought that color sorting was unnecessary, which surprised us, as we thought that would be a major advantage of *Arachne* over a physical jigsaw puzzle. We cut the feature.

2.2.2 P3 – Progress Report

- **New Puzzle Preview Panel:** We decided by P3 that there wasn't enough feedback in the system to help the user understand how difficult a puzzle they were making. This led to the design of the preview panel, which contained sample pieces that change as the user adjusts the options.
- **Frame:** Originally, the player had to assemble the puzzle within a bounding box. This was removed, as it is easy to accidentally assemble the puzzle slightly off of the box which would cause the player to have to move every single piece of the puzzle one at a time. The Frame was originally meant to help us in our win detection algorithms and with giving the player the right amount of workspace. We made other workarounds for these. Our win detection algorithm is smart enough not to need it, and the workspace automatically expands if the user tries to place a piece off the edge.

2.2.3 P4 – Alpha Release

- **Multiple Sort Bins:** The original point of Multiple Sort Bins was to help with auto-sorting, which we took out back in P2, so there was no longer any need for this feature.
- **Piece Placement Bounding Box:** Our internal playtesting showed that with Snap-to-Grid, it was slightly unclear where a piece would go when the user placed it. A box shadow was added to show where the piece would end up if dropped.
- **Expand / Contract Puzzle Redesign (Originally called Loose Weave):** Our graphic design of expanded puzzles has gone through several revisions. We're still not entirely happy with it, though we think it's better.

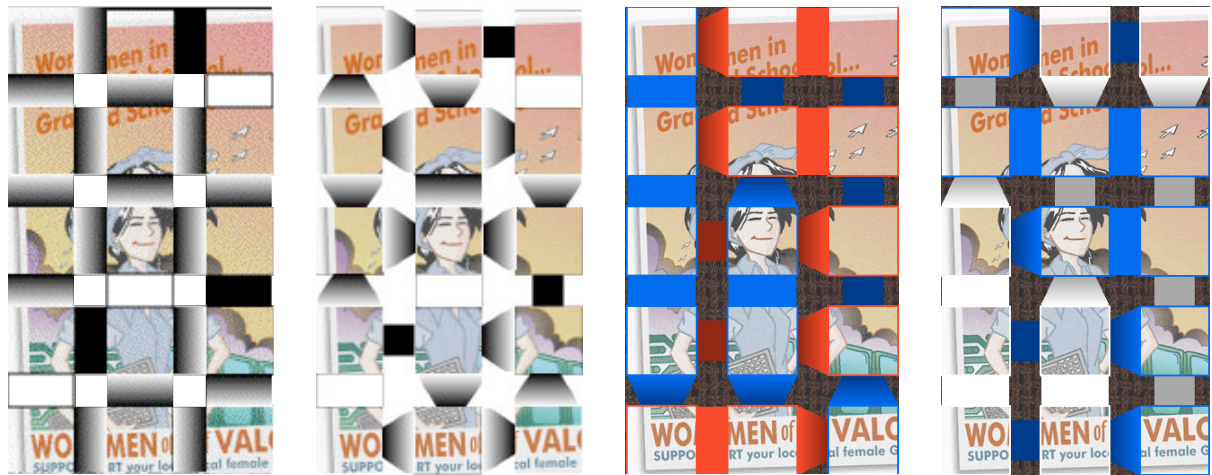


Figure 3: The Constant Struggle with Loose Weave. From left to right, P1 (sketch), P2 (sketch), P4 (screenshot), and P5 (screenshot).

- **Font:** When playtesting on Windows, our designer realized for the first time that our font became pixilated and hard to read. A last minute change fixed that problem, as well as making the columns in the Saved Puzzle Screen easier to line up, due to a fixed-width font.

3 Playtesting

For our playtesting, we set up two user groups, recruited from friends and family. Both groups were directed to a web page where they could download the game. They then installed *Arachne* on their own machines – and Java, if required, played at least one game (if possible) and then filled out a questionnaire. The questionnaire is included in the Appendix in §4.2 Playtesting Questionnaire. In addition, Observed testers were watched during this process while thinking aloud. Numerical data from the questionnaire is also included in the Appendix in §4.3 Questionnaire Responses.

3.1 Positive Feedback

In general, users liked *Arachne*. The game itself was interesting. Key attributes included:

- **Using Personal Pictures:** Players got into this, wanting to pick just the right picture to use.
- **Sounds:** The audio feedback was considered cute.
- **You Win:** Players liked that the game could tell when they won.
- **Color-Blind Safe:** *Arachne* got the color-blind stamp of approval from one such playtester.
- **Likert Results:** Mean overall rating of 4.7 (4 average, 7 best). Considering that there were some issues to overcome (discussed in the next section), we are pleased that our ratings fell on the positive half of the scale.
- **Status Messages:** Players saw and read the status messages, which helped them play the game.

3.2 Negative Feedback

In general, our negative feedback was regarding playability issues. We have been doing internal playtesting of technical issues all along, but playability problems are very hard to catch internally.

3.2.1 Critical Bugs

Critical bugs were ones which caused the player not to complete the game, either because they couldn't or because they didn't wish to.

Issue	Type	Fix
Couldn't figure out how to play	Playability	Added a tutorial for new players, drew attention to Help button, improved Help pages, improved Status Messages
Difficult installation on Windows	Technical	Added shortcut to automate most installation procedures, improved web site instructions
Resizing problems – buttons cut off so player can't create puzzle	Technical	Bug. Fixed.
Large images cause game to hang	Technical	Large images now automatically shrunk

3.2.2 Non-Critical Bugs

Issue	Type	Fix
Help button didn't work (user not on line)	Technical	Help pages now included with game, can be accessed locally
Didn't know how to log on.	Playability	When new player created, automatically logged in as that player
Scrolling in sort bin with mouse wheel veeery slow	Technical	Speed it up
Weaving is boring	Playability	None. That's the game.

Issue	Type	Fix
New Puzzle Window is confusing (is that the puzzle? The sample pieces get mistaken for bugs)	Playability	Covered in tutorial, also word "SAMPLE" now written over sample pieces
Help pages unclear	Playability	Revised
Don't understand purpose of expand. Often linked to not understanding weaving	Playability	Tutorial should fix the misunderstanding of weaving. Expand also explained in Help pages.
Wants to move groups of pieces	Playability	None. Would create interaction problems.
No Java	Technical	Update installation instructions to make downloading Java more explicit, installer checks for Java
Multi-step Status Messages disappearing before action completed	Technical	Broke down messages into more cases
Windows move to the middle, if the user moves them	Technical	Fixed
People confused to find Quit in Options	Playability	None. It doesn't hurt anything
Language inconsistent on web page (weave vs change places)	Technical	Fixed it
Tidy: Should scroll to top automatically (otherwise looks like all pieces disappeared)	Technical	Fixed it
"Why is it called 'Arachne'?"	Playability?	Added myth to web site
Doesn't say what image formats are acceptable	Technical	Added to image file chooser and help pages
Tile filler color hard to distinguish from texture.	Playability	Only one user had this issue, but that one user was Dr. Shaw, so we changed to to a color with more contrast.
Can't win after you save	Technical	Fixed it
First puzzle a little too difficult	Playability	Default number of pieces reduced from 20 to 10

3.2.3 Future Work

Some feedback pointed the way to new features or enhancements that we would like to add if we had more time.

- **Piece Swapping:** hard to understand. Visually it's unclear (very fast), sound is positive feedback. Not sure how to fix, maybe with a better animation (can actually see pieces swapping).

- **Drag and Drop:** instead of Click-Move-Click as main interaction. Mouse users want to drag. This wasn't a terrible bug, players mastered the interaction quickly, but if we had more time, we'd change the interaction model to support both.
- **Snap-to-Grid:** slightly off. This was scheduled to be fixed, but it turned out to be trickier than we thought and ran out of time.
- **Social Aspect:** It would be neat to be able to send someone a puzzle for them to play, or to arrange a competition where you play the same puzzle at the same time as someone else, and see who finishes first, like Boxerjam trivia contests. One would have to be careful of the social aspects, such that it doesn't become a pr0n game.

4 Appendix

4.1 Development Layers from Part 1

Our original development plan. Crossed out items are not in the final system.

Functional Minimum – Required by March 1, Requested by Feb 9 (2 weeks from Jan 26)

- One puzzle (fixed rows and columns)
- Can manipulate pieces – single left click on piece picks it up / places it, right click while holding a piece rotates it 90 degrees CW, right click on an occupied space on the board weaves
- Tiles display png images (there are pieces with images on them)
- Pieces snap to grid in the main workspace
- Can complete puzzle (win condition checking)

Low Goal – Requested by March 1 (3 weeks)

- Adjust number of rows and columns (can adjust difficulty)
- Import your own pictures to make puzzles
- Pieces can either have a plain background or have images filled in
- Can have the original picture displayed in entirety in a separate window

Medium Goal – Required by April 5, Request at least 50% complete by March 1, Requested by March 15 (2 weeks)

- ~~Sorting Windows (tab organization)~~
- ~~Dumb Autosort by color (checks for specified existence of color in each piece)~~
- Sound effects / queues
- Loose and tight weave whole puzzle (to avoid lost pieces and to see image)
- Pieces can be longer than what fits in the puzzle (extraneous tiles in pieces)
- Look nice (no grey text buttons)
- Save / Reload Puzzle (save workspace and all bins)
- User login (no password, just to differentiate imported images)
- ~~Original image displayed in overlay mode in main window (second tab above workspace to show image over workspace)~~
- Dumb tidy button (arranges tiles in bin without preserving orientation)

High Goal – Complete as much as possible by April 2 (2 weeks, 4 days)

- Resize the Window
- ~~Zoom in/out of puzzle~~
- ~~Loose and tight weave, parts of puzzle (so can complete a section of the puzzle and still work on another part of the puzzle)~~
- ~~Hints (Place this piece in this row)~~
- ~~Victory animation / animated transitions (animate window movement)~~
- ~~Intelligent piece placement (two identical pieces are interchangeable, "The White Puzzle")~~

- Cross-platform compatibility (Mac, Linux)
- ~~Smart tidy button (preserves orientation of pieces as placed in bins)~~

4.2 Playtesting Questionnaire

The following questionnaire was filled out by all playtesters. Whitespace for answers has been removed in this version for length reasons.

Thank you for agreeing to playtest Arachne. To help us improve our game, please fill out this questionnaire and send it to marleigh@cc.gatech.edu.

Your responses going to be read by a human, not a computer, so feel free to add comments or clarifications for your answers.

BACKGROUND INFORMATION

Gender:

Age:

How often do you use a computer? Select one:

- Several times per day or more
- Once a day
- Several times per week
- Once a week
- Less than once a week

For what purpose do you generally use computers? Select all that apply:

- Email
- Web browsing
- Word Processing
- Video Games
- Work / School
- Programming

How often do you play video games? Select one:

- At least once per day
- Several times per week
- Once a week
- Less than once a week
- I don't play video games.

Please list some of the games you like best or play most frequently (Examples: Solitaire, Doom, Minesweeper, Super Mario Brothers, Starcraft, EverQuest, etc.)

How long have you been playing Arachne?

Have you been using a mouse to play Arachne? If so, how many buttons are on the mouse?

What operating system are you using? Examples: Windows 2000, Mac OS 10.2.3. If you don't know, write "Don't know"

What version of Java are you using? Example: 1.4.2

How to check:

Windows: Go to Control Panel -> Add / Remove Programs.

Scroll down to the J's until you see something like

"Java Runtime Environment"

The number listed on that line is the version number.

Mac and UNIX: Type the command "java -version" at a prompt
If you aren't sure, write "Don't know"

Did you have to install or upgrade Java to play Arachne?

ARACHNE

Rate your overall experience with Arachne on a scale from 1 to 7

1 Extremely negative

2 Negative

3 Somewhat negative

4 Neutral

5 Somewhat positive

6 Positive

7 Extremely positive

Please explain your answer. Was there a specific event that contributed to your answer?

Rate your enjoyment of playing the actual game on a scale from 1 to 7

1 Extremely unenjoyable

2 Unenjoyable

3 Somewhat unenjoyable

4 Neutral

5 Somewhat enjoyable

6 Enjoyable

7 Extremely enjoyable
Please explain your answer.

Rate your understanding of Arachne on a scale from 1 to 7.
We aren't asking about your skill at playing the game,
rather whether you think you understand how. Can you start
a game successfully? Do you think you've found all of the
features. Do you know how to use them?

- 1 No understanding at all
- 2 Understand a few things
- 3 Understand some things
- 4 Average understanding
- 5 Some higher expertise
- 6 Expert
- 7 Complete mastery

Please explain your answer.

Rate the likelihood that you will continue to play Arachne
on a scale from 1 to 7

- 1 Extremely unlikely
- 2 Unlikely
- 3 Somewhat unlikely
- 4 Neutral
- 5 Somewhat likely
- 6 Likely
- 7 Extremely likely

Please explain your answer.

Rate the likelihood that you would recommend Arachne to a
friend on a scale from 1 to 7

- 1 Extremely unlikely
- 2 Unlikely
- 3 Somewhat unlikely
- 4 Neutral
- 5 Somewhat likely
- 6 Likely
- 7 Extremely likely

Please explain your answer.

What was your favorite part of the game?

What was your least favorite part of the game?

Was there any point at which you weren't sure what to do?
How did you resolve it?

Did you encounter any technical problems while playing the game? If so, please describe them below. Attach the picture you were using and/or a screen shot, if you can.

May we contact you if we need clarification on any of your answers?

Anything else you'd like to tell us about the game?

4.3 Questionnaire Responses

These are the results of the questionnaires.

Columns omitted:

- *Frequency of Computer Use – All answered Several times a day or more*
- *Use Computers for Email, Web, Word processing – All answered yes*

Gender	Age	Observed / Remote	Play Video Games	Programming	Play video games (1 Never)	How long playing	Mouse	Windows/ Mac	OS	Java	Overall	Enjoy	Understand	Continue Playing	Recommend
F	21	O	Yes	No	4	30	7 button mouse	Windows	ME	1.4.25	5	4	5	5	5
F	20	O	Yes	Yes	3	30	5 button mouse	Windows	2000	1.4.15	5	5	4	4	4
M	22	O	Yes	Yes	2	30	2 button mouse	Windows	XP	1.4.25	5	5	5	4	4
M	23	O	Yes	Yes	3	30	Touchpad, two buttons	Windows	XP Pro	1.4.27	6	5	3	5.5	
M	23	O	Yes	No	4	30	3 button mouse	Macintosh	10.3.3	1.4.25	6	7	6	7	7
F	35	R	Yes	No	5	30	two button mouse + mouse wheel	Windows	XP Pro	1.4.24		4	2	7	
F	36	R	Yes	Yes	5	2 days	3 button mouse and 2 button mouse	Windows	XP and 2000	1.4.24	5	4	3	4	
M	34	R	Yes	Yes	4	1 day	3 button mouse	Macintosh	10.3.3	1.4.25	5	6	3	5	
F	22	R	Yes	No	3	60	Touchpad, 1 button	Macintosh	10.3.3	1.4.25	6	5	2	4	
F	23	R	No	No	1	20	Touchpad, 2 buttons	Windows	XP	1.4.25	5	2	3	5	
M	18	R	Yes	No	4	3 days	2 button mouse	Windows	2000	1.4.26	6	4	6	6	
F	23	R	Yes	Yes	2	30	3 button mouse	Windows	XP	1.4.25	6	4	3	2	