

Using Fedora in the classroom

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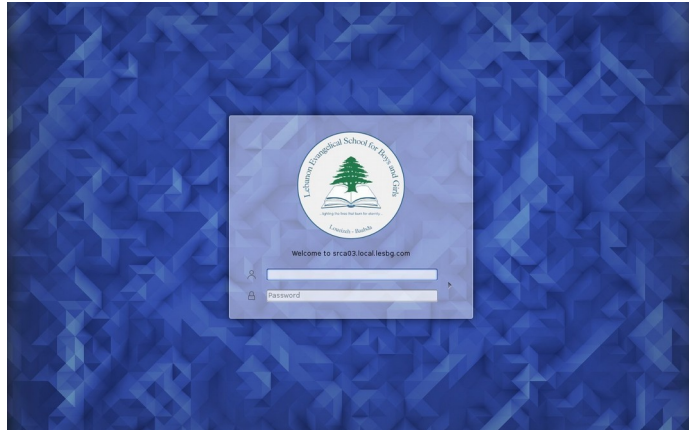
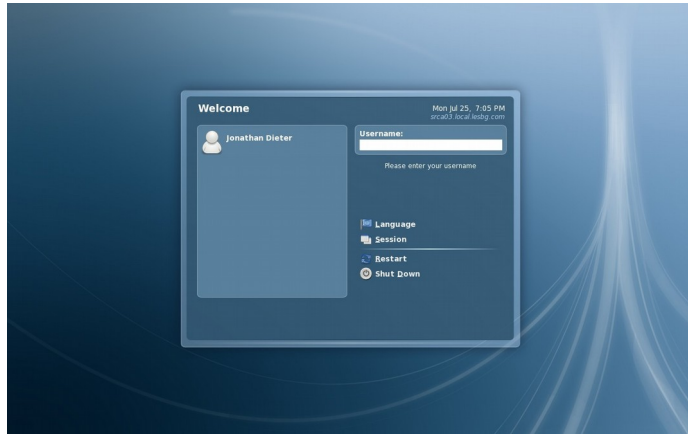


Lebanon Evangelical School



- Founded in 1860
- Roughly 1600 students from 3-18
- Switched to Linux on servers in 2005

Fedora in our school



- Switched workstations to Fedora 8 in 2008
- Using Fedora 23 right now

Why *not* do it?



- Need local expertise
- Update treadmill ← No longer a problem with Fedora's QA
- It's different ← Never a good argument

Why do it?



Administrative tools



FreeIPA

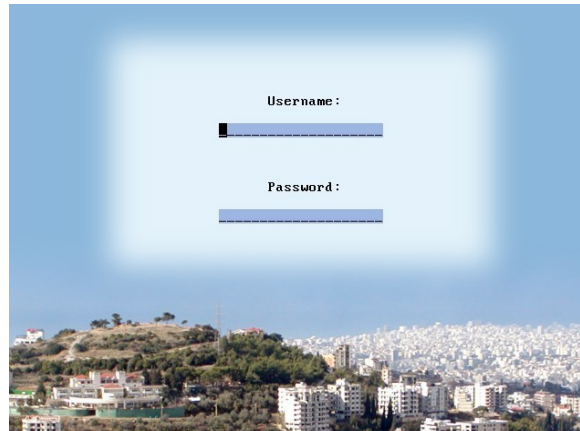
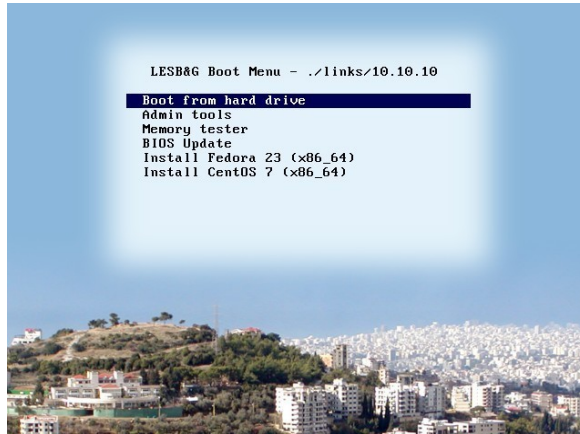


The screenshot shows the FreeIPA web interface in a Mozilla Firefox browser. The URL is <https://ipa1.lesbg.com/ipa/ui/#/e/user/search//page=100>. The interface displays a list of active users with the following columns: User login, First name, Last name, Status, UID, Email address, Telephone Number, and Job Title. The user 'sa019' is highlighted.

| <input type="checkbox"/> | User login | First name | Last name | Status | UID | Email address | Telephone Number | Job Title |
|-------------------------------------|------------|------------|------------|-----------|--------|---------------|------------------|-----------|
| <input type="checkbox"/> | r2005 | Rita | Zein | ✓ Enabled | 3179 | | | |
| <input type="checkbox"/> | r2006 | Robert | Zigby | ✓ Enabled | 3945 | | | |
| <input type="checkbox"/> | r2007 | Ronaldo | Zahr | ✓ Enabled | 3797 | | | |
| <input type="checkbox"/> | r2008 | Ruby | Zahr | ✓ Enabled | 4407 | | | |
| <input type="checkbox"/> | r2009 | Rafic | Ziad | ✓ Enabled | 5280 | | | |
| <input type="checkbox"/> | r2010 | Rayan | Zouein | ✓ Enabled | 1041 | | | |
| <input type="checkbox"/> | r2011 | Romy | Zein | ✓ Enabled | 101225 | | | |
| <input type="checkbox"/> | sa008 | Sally | Abboud | ✓ Enabled | 1559 | | | |
| <input type="checkbox"/> | sa018 | Sandra | Abdelhalek | ✓ Enabled | 2347 | | | |
| <input checked="" type="checkbox"/> | sa019 | Stephen | Al Asmar | ✓ Enabled | 2263 | | | |
| <input type="checkbox"/> | sa020 | Salim | Akl | ✓ Enabled | 3428 | | | |
| <input type="checkbox"/> | sa023 | Serge | Ajaj | ✓ Enabled | 1127 | | | |
| <input type="checkbox"/> | sa024 | Safwan | Achi | ✓ Enabled | 2285 | | | |
| <input type="checkbox"/> | sa027 | Sireen | Ajjour | ✓ Enabled | 2873 | | | |
| <input type="checkbox"/> | sa028 | Stephanie | Ajjour | ✓ Enabled | 3429 | | | |
| <input type="checkbox"/> | sa032 | Shadi | Abi Khalil | ✓ Enabled | 3619 | | | |
| <input type="checkbox"/> | sa033 | Souren | Alliek | ✓ Enabled | 3726 | | | |
| <input type="checkbox"/> | sa034 | Safwan | Ayvazian | ✓ Enabled | 3430 | | | |

- User administration
- Both web and command line interface
- Provides accountability
- Every student and staff member gets a username
- Students are allowed to use school systems before and after school

iPXE



- All machines boot off the network
- Default is to then boot off the hard drives
- Must be authenticated to access Admin tools
- Authentication is over https
- System imaging options in Admin tools

LESSON



Class List - Mozilla Firefox

Class List

2015 - 2016

Infant Junior Senior

4th quarter

| | Class | Grade | Students | Delete |
|-----------|---------|-------|----------|--------|
| V.E.R.T.S | 6A | 6 | 32 | X |
| V.E.R.T.S | 6B | 6 | 33 | X |
| V.E.R.T.S | 6C | 6 | 33 | X |
| V.E.R.T.S | 6D | 6 | 12 | X |
| V.E.R.T.S | 7A | 7 | 32 | X |
| V.E.R.T.S | 7B | 7 | 27 | X |
| V.E.R.T.S | 7C | 7 | 24 | X |
| V.E.R.T.S | 7D | 7 | 14 | X |
| V.E.R.T.S | 8A | 8 | 34 | X |
| V.E.R.T.S | 8B | 8 | 34 | X |
| V.E.R.T.S | 8C | 8 | 34 | X |
| V.E.R.T.S | 8D | 8 | 13 | X |
| V.E.R.T.S | ALS | 8 | 9 | X |
| V.E.R.T.S | FAP2 Y1 | 8 | 1 | X |
| V.E.R.T.S | FAP2 Y2 | 8 | 2 | X |
| V.E.R.T.S | FAP2 Y3 | 8 | 5 | X |
| V.E.R.T.S | 9A | 9 | 26 | X |
| V.E.R.T.S | 9B | 9 | 31 | X |
| V.E.R.T.S | 9C | 9 | 34 | X |
| V.E.R.T.S | 9D | 9 | 6 | X |
| V.E.R.T.S | 10A | 10 | 40 | X |
| V.E.R.T.S | 10B | 10 | 32 | X |
| V.E.R.T.S | 10C | 10 | 31 | X |
| V.E.R.T.S | 11A | 11 | 25 | X |
| V.E.R.T.S | 11D | 11 | 5 | X |
| V.E.R.T.S | 11H | 11 | 11 | X |
| V.E.R.T.S | 11S | 11 | 27 | X |

- Web-based marking system
- Used at our school for over ten years
- Is now central management system for the whole school
- Source on Github under GPL
- Initial configuration *extremely* difficult!

Ansible



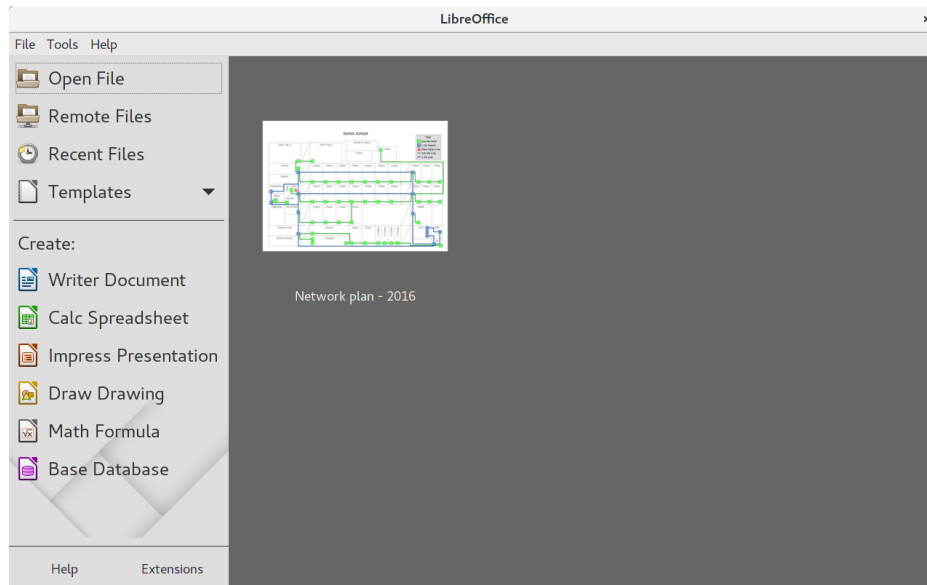
```
ansible@ansible:/etc/ansible/lesbg
File Edit View Search Terminal Help
TASK: [workstations-school-net | set package manager to dnf] *****
ok: [srcas03.local.lesbg.com]
TASK: [workstations-school-net | set strict mode to False] *****
changed: [srcas03.local.lesbg.com]
TASK: [workstations-school-net | clear cache cookies] *****
changed: [srcas03.local.lesbg.com]
TASK: [workstations-school-net | install GNOME Desktop for < F21] *****
skipping: [srcas03.local.lesbg.com]
TASK: [workstations-school-net | install GNOME Desktop for >= F21] *****
changed: [srcas03.local.lesbg.com]
TASK: [workstations-school-net | install yum langpack support] *****
skipping: [srcas03.local.lesbg.com]
TASK: [workstations-school-net | install dnf langinstall support] *****
ok: [srcas03.local.lesbg.com]
TASK: [workstations-school-net | install multiple language support] *****
changed: [srcas03.local.lesbg.com] => (item=en_US)
changed: [srcas03.local.lesbg.com] => (item=en_GB)
changed: [srcas03.local.lesbg.com] => (item=ar_LB)
changed: [srcas03.local.lesbg.com] => (item=fr_FR)
changed: [srcas03.local.lesbg.com] => (item=hy)
TASK: [workstations-school-net | install LibreOffice] *****
ok: [srcas03.local.lesbg.com]
TASK: [workstations-school-net | prepare to install Fonts] *****
changed: [srcas03.local.lesbg.com]
TASK: [workstations-school-net | install Fonts] *****
```

- Task-based configuration
- Changes are quick
- Deployment also quick
- Designed to be repeatable

Teaching tools

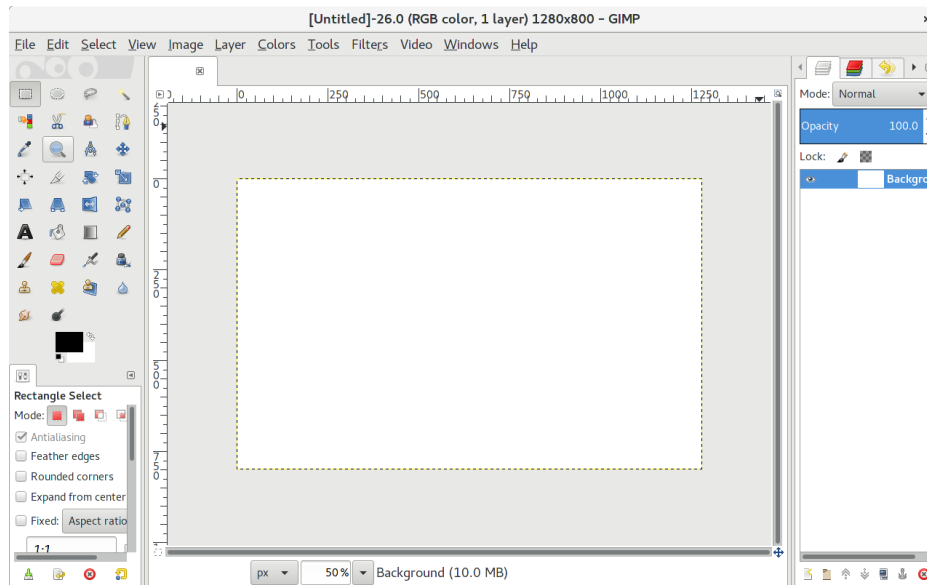


Libreoffice



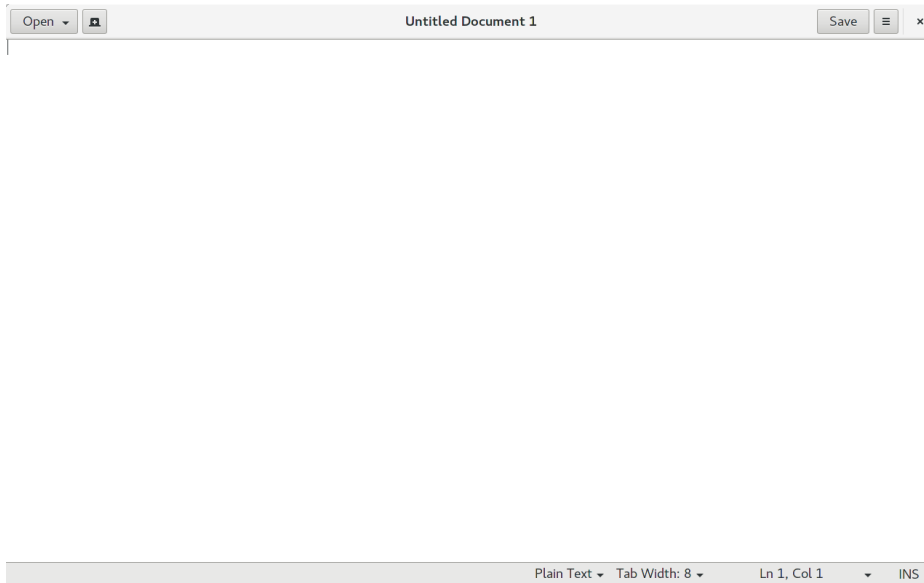
- Word processing
- Spreadsheets
- Presentations

The GIMP



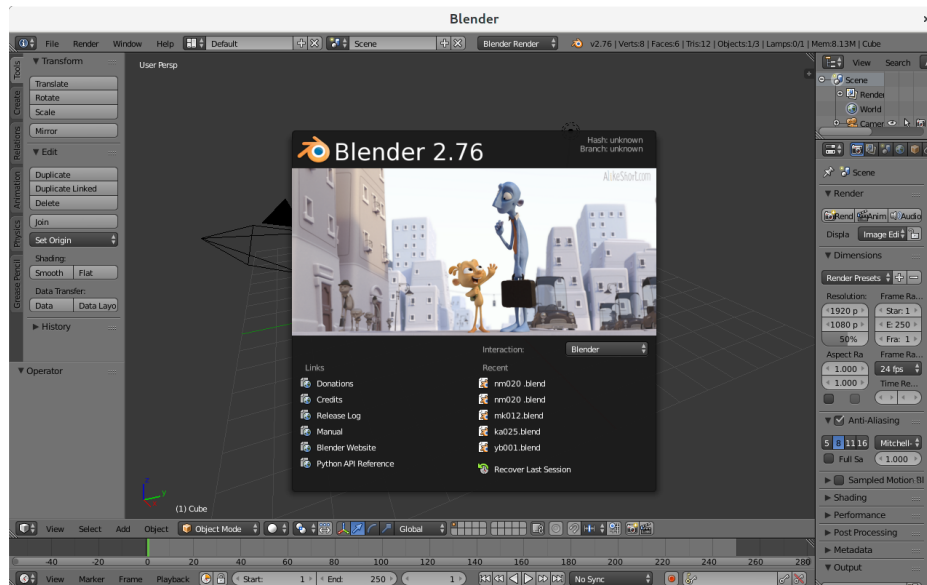
- Used to teach photo editing
- Single-window mode makes it usable

gedit



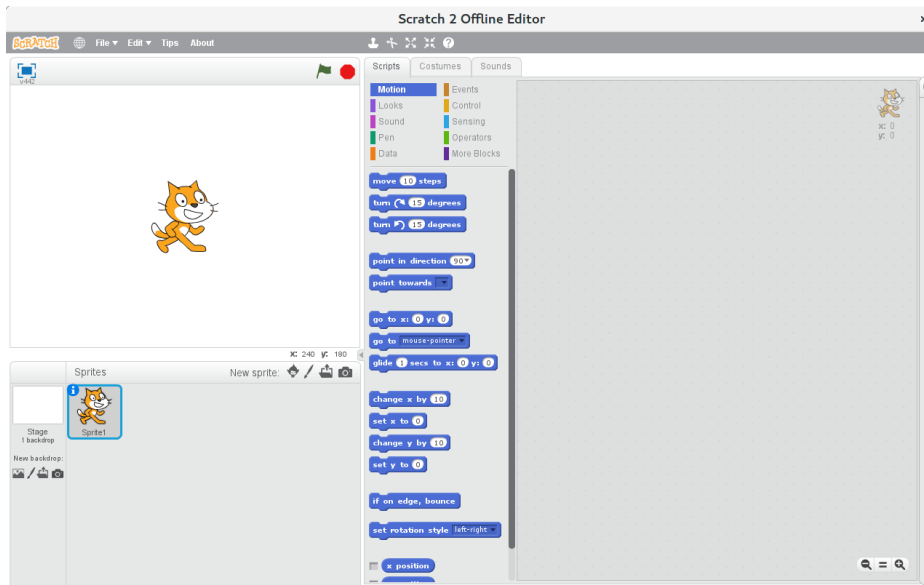
- Text editor
- Has syntax highlighting
- Has automatic indentation
- Used to teach HTML and CSS

Blender



- Used for 3D modeling
- Steep learning curve
- Incredibly powerful

Scratch



- Graphical programming language
- Easy to understand
- Version 2 not available in Fedora because it requires Adobe AIR
- Spec to build RPM in links
- Version 3 will be HTML5 (hopefully)

Python



```
jonathan@dlaptop:~  
File Edit View Search Terminal Help  
Python 2.7.12 (default, Jul 18 2016, 10:55:51)  
[GCC 6.1.1 20160621 (Red Hat 6.1.1-3)] on linux2  
Type "help", "copyright", "credits" or "license" for more information.  
>>>
```

- Programming language
- Fun to teach
- Easy for beginners
- Very powerful

Curriculum



Theory of computer education



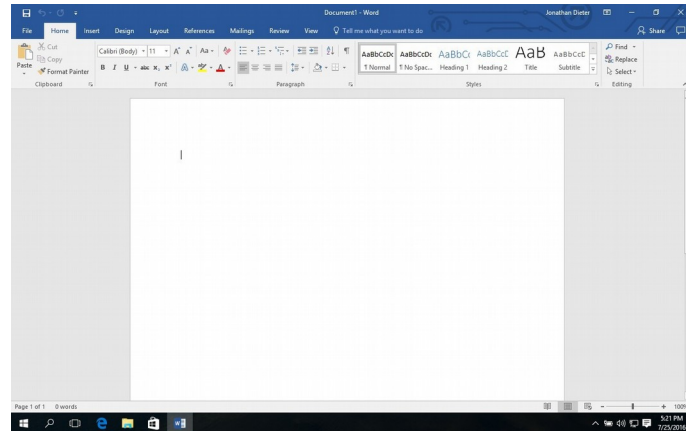
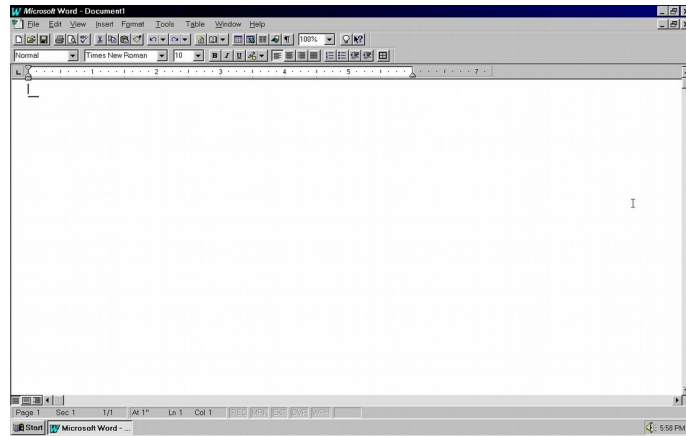
Memorization

VS



Comprehension

Software changes



- Word 95 vs Word 2016
- Many changes
- If students are forced to memorize how to use Word 95, they will struggle to use Word 2016
- If they understand how/why things actually work, then the changes will be less difficult

Teacher requirements



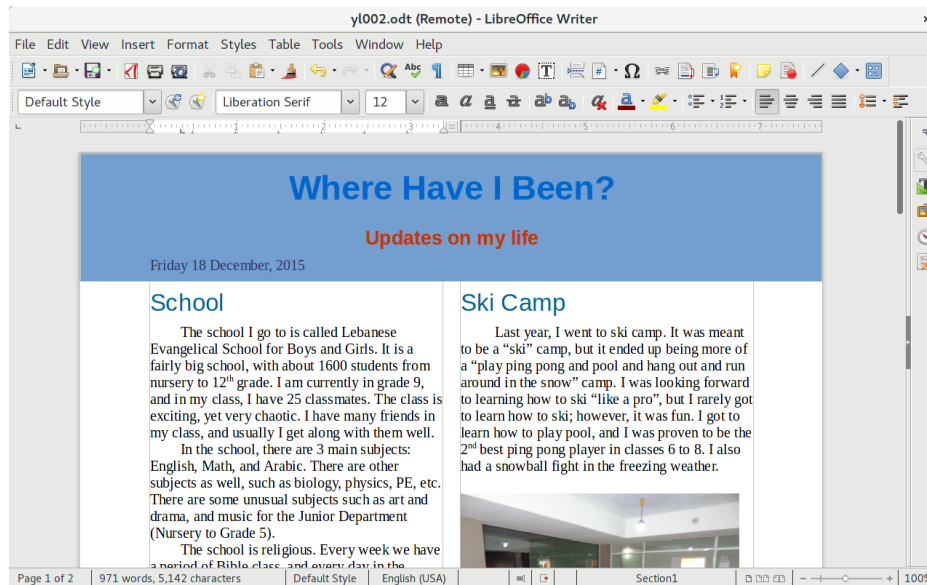
- Passion – A teacher must enjoy teaching their subject
- Knowledge – They must have a thorough understanding of what they're teaching
- Compassion – Above all else, a teacher must truly care for *all* of their students, not just the ones that don't cause problems

Curriculum



- Touch typing
- Databases
- Hardware
- Word processing
- Image editing
- Presentations
- Spreadsheets
- HTML
- 3D modeling
- Programming

Word processing



- Columns
- Photos
- Text boxes
- Drawing tools
- Styles
- Giving credit
- Checking licenses

Image editing



- Cropping out the background
- Adding new things to it
- Ethics of changing photos

Spreadsheets



da009.ods (Remote) - LibreOffice Calc

File Edit View Insert Format Sheet Data Tools Window Help

Liberation Sans 10

E7 =D7*\$C\$5

| Store Items: | Price: | Number: | Subtotal: | Tax: | Total: |
|----------------------------|---------|---------|-----------|--------|----------|
| Sweaters: | \$14.00 | 3 | \$42.00 | \$2.10 | \$44.10 |
| Pants: | \$23.00 | 4 | \$92.00 | \$4.60 | \$96.60 |
| Hats: | \$5.00 | 1 | \$5.00 | \$0.25 | \$5.25 |
| Shirts: | \$10.00 | 2 | \$20.00 | \$1.00 | \$21.00 |
| Shoes: | \$32.00 | 1 | \$32.00 | \$1.60 | \$33.60 |
| Complete Total Without Tax | | | | | \$191.00 |
| Complete Total With Tax | | | | | \$200.55 |

Sheet1

Sheet 1 of 1

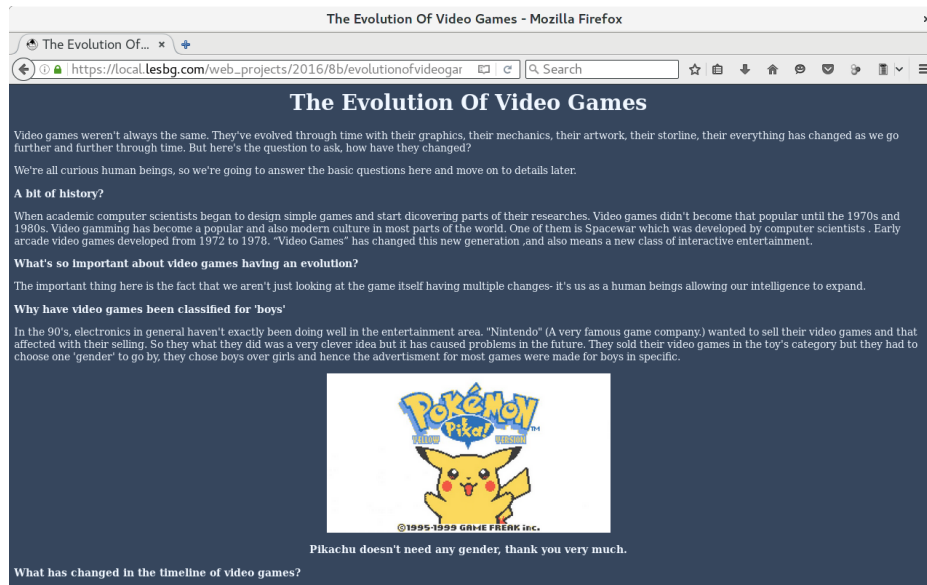
Default

Sum=\$2.10

142%

- Formulas
- How to design invoices
- How to design gradesheets
- Charts

Web page design



- HTML basics
- CSS for a consistent style
- Online privacy

3D modeling

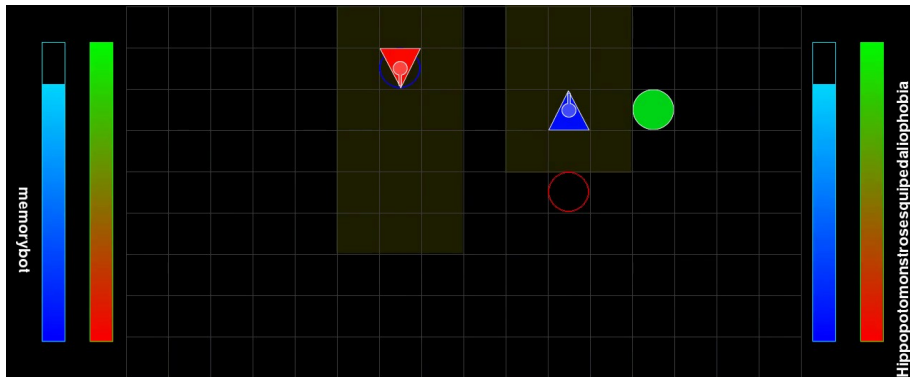


- How to create objects
- How to design materials that look realistic
- Adding textures to make objects look more lifelike
- Animation

Programming



- Basics using Scratch
- Loops and conditionals
- Group project: Make a game
- Advanced programming in Python
- Design a simple AI that can defeat other students' AIs



Goals



- Our students leave the school understanding computer theory
- They have a good grasp on how and why computer applications work as they do
- They understand the importance of the ethics involved in creating and working with digital media

Links



- iPXE: <http://ipxe.org/>
- LES Ansible plays: <https://github.com/lesbg/ansible>
- LESSON: <https://github.com/lesbg/lesson-1.0>
- Scratch: <https://scratch.mit.edu>
- Scratch 2 RPM spec file: <http://lesloueizeh.com/jdieter/scratch2>
- LES Scratch projects: <http://scratch.lesbg.com>
- Botwar: <https://github.com/lesbg/botwar>