



Human-Computer Interaction: Heuristics

Dr Kami Vaniea

Heuristics

- Basic idea: Broad set of principles that apply to practically any type of interface. They function as both a goal for good design and a key tool in some usability evaluations.
- Pros
 - Simple, high level, and easy to explain to others.
 - Many examples online of what “good” interfaces that follow principles look like.
 - Thinking about heuristics can help you spot problems.
- Cons
 - High level so may not provide useful guidance for low level problems.
 - Most common types of problems, but they do not represent all problems

Nielsen's 10 Heuristics

“Heuristics” are simple rules that can be easily applied and are true in most situations. Using the ten heuristics to the right we can detect a large percentage of usability issues.

1. Visibility of system status
2. Match between system and the real world
3. User control and freedom
4. Consistency and standards
5. Error prevention
6. Recognition rather than recall
7. Flexibility and efficiency of use
8. Aesthetics and minimalist design
9. Help users recognize, diagnose, and recover from errors
10. Help and documentation

Visibility of system status

- The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.
- Why
 - People learn from seeing the feedback of their actions
 - Knowledge of system state is necessary for some actions

Visibility of system status

Me adding a Q&A session to my Google calendar

The screenshot shows the Google Calendar 'Add event' interface. At the top, there is a search bar for the calendar and a navigation bar with buttons for 'SAVE', 'Discard changes', 'Delete', and 'More Actions'. The event title is 'Hci QandA'. The date and time are set to 10/6/2016 from 2:00pm to 4:00pm in the (GMT+01:00) London time zone. There are checkboxes for 'All day' and 'Repeat...'. Below the event details, there are fields for 'Where' (location), 'Video call' (Add video call), 'Calendar' (Kami Vaniea), and 'Description'. There is also an 'Attachment' field (Add attachment). The 'Event color' is set to the default blue color. The 'Notifications' section shows 'No notifications set' with an option to 'Add a notification'. The 'Show me as' section is set to 'Busy'. The 'Visibility' section is set to 'Calendar default'. At the bottom, there is a note about sharing settings and a 'Publish event' link.

Google Search Calendar

← SAVE Discard changes Delete More Actions

Hci QandA

10/6/2016 2:00pm to 4:00pm 10/6/2016 (GMT+01:00) London Time zone

All day Repeat...

Event details Find a time

Where Enter a location

Video call Add video call

Calendar Kami Vaniea

Description

Attachment Add attachment

Event color |

Notifications No notifications set Add a notification

Show me as Available Busy

Visibility Calendar default Public Private

By default this event will follow the [sharing settings](#) of this calendar: event details will be visible to anyone who can see details of other events in this calendar. [Learn more](#)

[Publish event](#)

Add guests
Enter guest email address

Guests can
 modify event
 invite others
 see guest list

Visibility of system status

Better add a reminder
or I might forget to go

The screenshot shows the Google Calendar event creation interface. At the top, there's a search bar and navigation buttons like 'SAVE', 'Discard changes', 'Delete', and 'More Actions'. The event title is 'Hci QandA'. The date and time are set to 10/6/2016 from 2:00pm to 4:00pm in the GMT+01:00 London time zone. There are checkboxes for 'All day' and 'Repeat...'. Below this, there are tabs for 'Event details' and 'Find a time'. The 'Where' field is empty with a placeholder 'Enter a location'. There's a 'Video call' section with an 'Add video call' link. The 'Calendar' is set to 'Kami Vaniea'. The 'Description' field is empty. There's an 'Attachment' section with an 'Add attachment' link. A 'Notifications' section is highlighted with a red box, showing a notification set for 10 minutes before the event. Below this, there are options for 'Show me as' (Available or Busy) and 'Visibility' (Calendar default, Public, or Private). A note at the bottom states that the event will follow the sharing settings of the calendar.

Google Search Calendar

← SAVE Discard changes Delete More Actions

Hci QandA

10/6/2016 2:00pm to 4:00pm 10/6/2016 (GMT+01:00) London Time zone

All day Repeat...

Event details Find a time

Where Enter a location

Video call Add video call

Calendar Kami Vaniea

Description

Attachment Add attachment

Notifications Notification 10 minutes ×

Show me as Available Busy

Visibility Calendar default Public Private

By default this event will follow the [sharing settings](#) of this calendar: event details will be visible to anyone who can see details of other events in this calendar. [Learn more](#)

[Publish event](#)

Add guests

Enter guest email address Add

Guests can

modify event

invite others

see guest list

Is the reminder saved?

Google Search Calendar

← SAVE Discard changes Delete More Actions

Hci QandA

10/6/2016 2:00pm to 4:00pm 10/6/2016 (GMT+01:00) London Time zone

All day Repeat...

Event details Find a time

Where Enter a location

Video call Add video call

Calendar Kami Vaniea

Description

Attachment Add attachment

Event color |

Notifications Notification 10 minutes x
[Add a notification](#)

Show me as Available Busy

Visibility Calendar default Public Private

By default this event will follow the [sharing settings](#) of this calendar: event details will be visible to anyone who can see details of other events in this calendar. [Learn more](#)

[Publish event](#)

Add guests
Enter guest email address Add

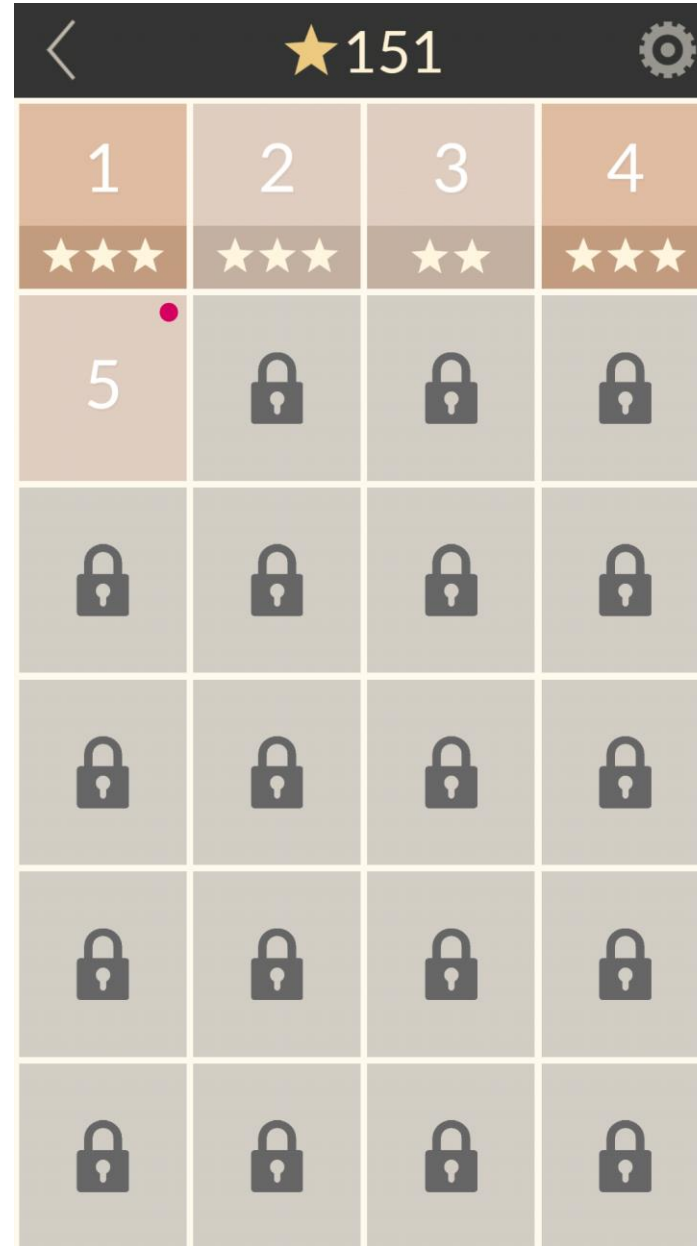
Guests can
 modify event
 invite others
 see guest list

Visibility of system status

I clicked the back button without clicking “save” and get a warning.

The screenshot shows the Google Calendar event creation interface. At the top, there is a search bar and navigation buttons: a back arrow, a red 'SAVE' button, 'Discard changes', 'Delete', and a 'More Actions' dropdown menu. The event title is 'Hci QandA'. The date and time are set to 10/6/2016 from 2:00pm to 4:00pm in the (GMT+01:00) London time zone. There are checkboxes for 'All day' and 'Repeat...'. Below this, there are tabs for 'Event details' and 'Find a time'. The 'Where' field is empty. There are links for 'Add video call' and a calendar dropdown set to 'Kami Vaniea'. A large text area is for the 'Description'. There is an 'Add attachment' link. The 'Event color' is selected as the first blue square. The 'Notifications' are set to 'Notification' every '10 minutes'. There are radio buttons for 'Show me as' (Available, Busy) and 'Visibility' (Calendar default, Public, Private). A warning dialog box titled 'Your Event' is centered on the screen, containing the message 'Your event has not been saved.' and two buttons: 'Discard changes' and 'Continue editing'. On the right side, there is an 'Add guests' section with an input field and an 'Add' button, and a 'Guests can' section with checkboxes for 'modify event', 'invite others', and 'see guest list'. At the bottom, there is a 'Publish event' link and a note about sharing settings.

Good example:
clear which levels
have been played,
how they did,
what level the
player is currently
on, and what
levels are still
locked.



Match between system and the real world

- The interface should use concepts, language and real-world conventions that are familiar to the user.
- Why
 - The user already has knowledge from the outside world. A user interface can leverage that knowledge.
 - If the interface does not match the way the world typically works people will become confused.
 - Metaphors and affordances are useful here.

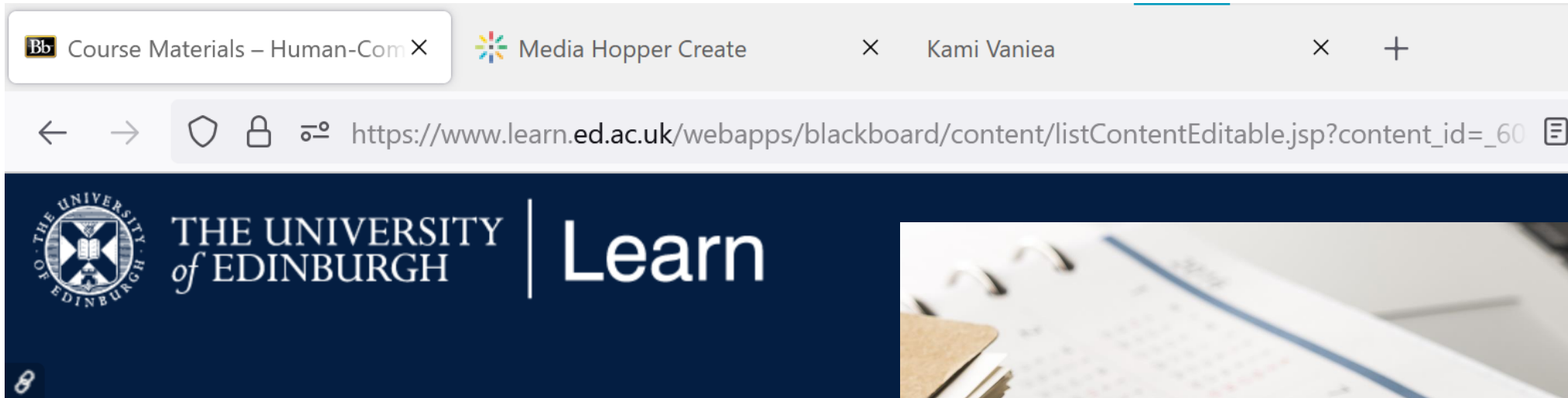
Knobs match burner positions



Knobs not aligned with “real world”



Notebook “tabs” -> browser “tabs”

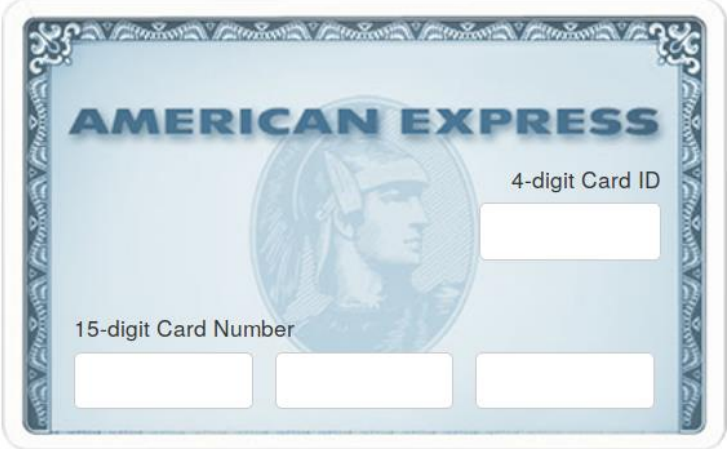


Good example:
Data entry boxes
match layout of
the card.

1. Get Started 2. Set Up 3. Finish

Welcome! Let's get started

Please enter your Card details to begin.



AMERICAN EXPRESS

4-digit Card ID

15-digit Card Number

Confirm

User control and freedom

- Allow the user to have control of the interaction. Users should be able to undo actions, exit from any sequence of actions, and not be forced into a series of actions.
- Why
 - Users make errors sometimes.
 - They need the ability to go back and correct the errors.
 - Users need a way to “exit”.

Poor example:
cookie dialogs
that only say:
“I accept”.

User has no
choices and is
forced into
action.

08:01

https://www.heraldscotland.com/ne

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The Herald

Sorry for the intrusion...

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You can manage your settings [here](#) and get more information via our [privacy notice](#).

I Accept

22:26

BUSINESS AND TECH



Jessica Chou for The New York Times

A Big Penalty Awaits Facebook, but Regulators Are Split Over How Big

[Review our cookie policy](#) X

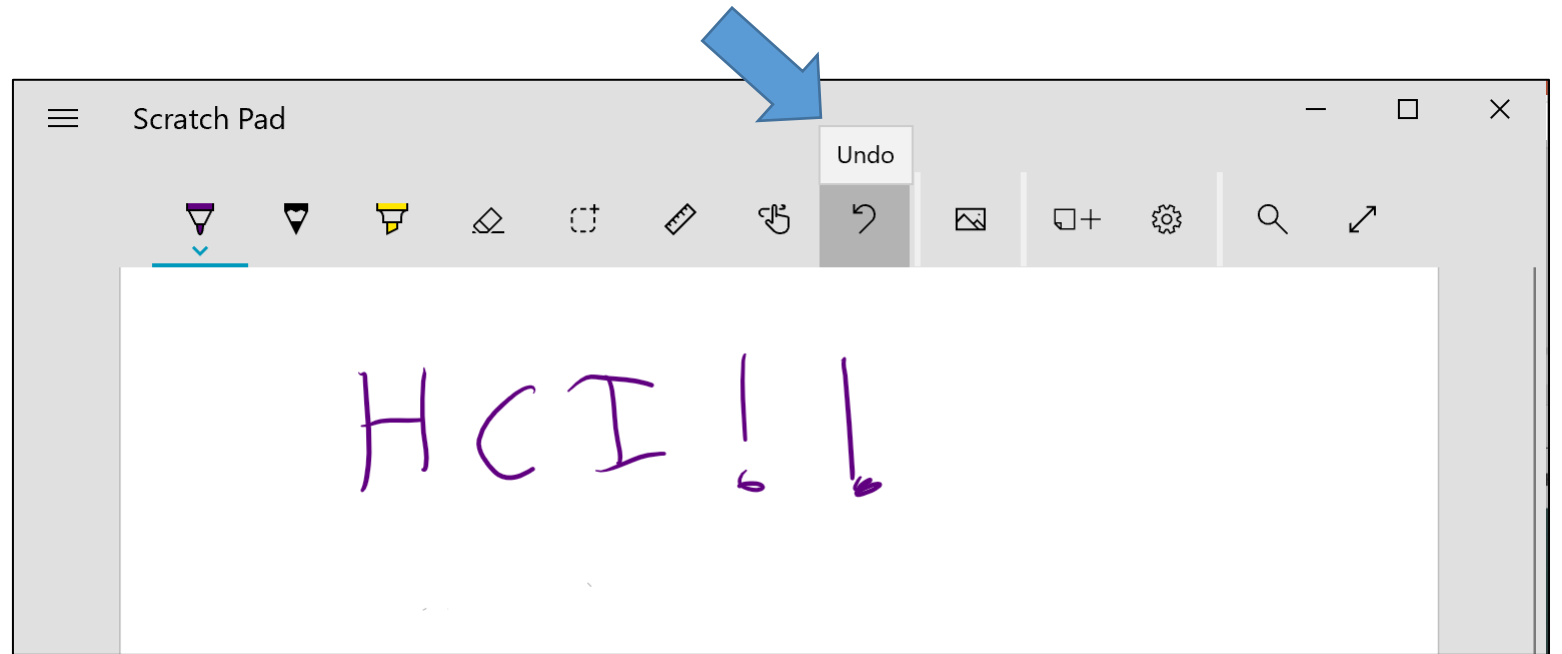
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We use cookies and similar technologies to **recognize your repeat visits and preferences**, as well as to **measure the effectiveness of campaigns and analyze traffic**. To learn more about cookies, including how to disable them, view our [Cookie Policy](#).

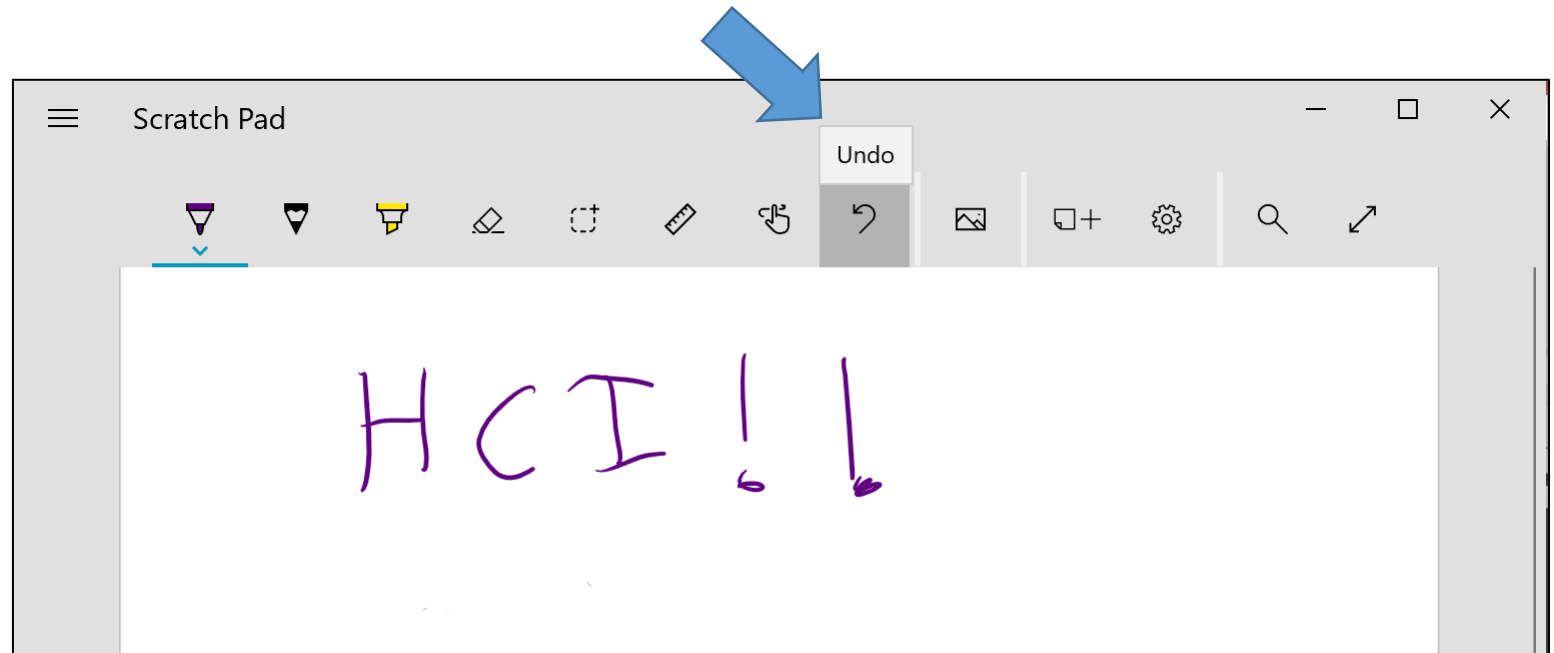
By clicking "I Accept" or "X" on this banner, or using our site, you consent to the use of cookies unless you have disabled them.

I ACCEPT

Good example: clear undo button and an x for exiting the program. Also an eraser option.



Good example: option to cancel the whole booking, not just continue.

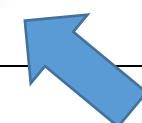


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We would also like to pass on your details to our partners or approved suppliers so that they may contact you about their products and services. If you wish to receive such information, please tick the box

Continue [\[cancel entire booking\]](#)



Consistency and standards

- Information that is the same should appear to be the same.
- Information that is different should be expressed differently.
- Developers need to know the conventions being used in the software.
- Why
 - Similar to the real world heuristic, people can leverage things they already know.
 - They will expect that something they learned will continue to be true.

Poor example: Stop signs are always red....

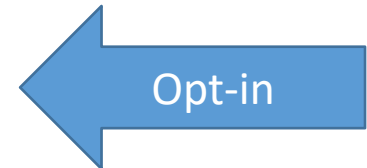
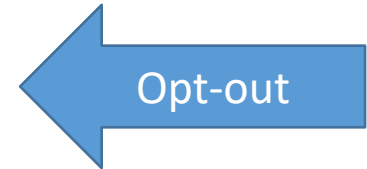


Poor example: tick boxes mean opposite things

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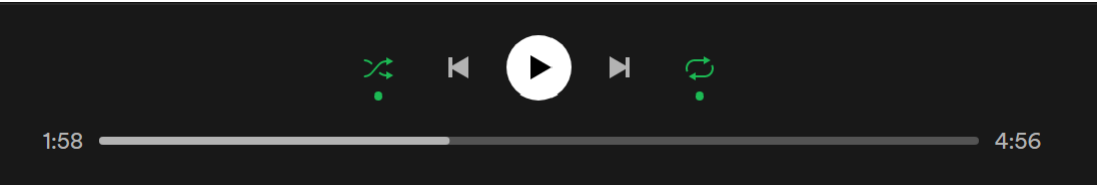
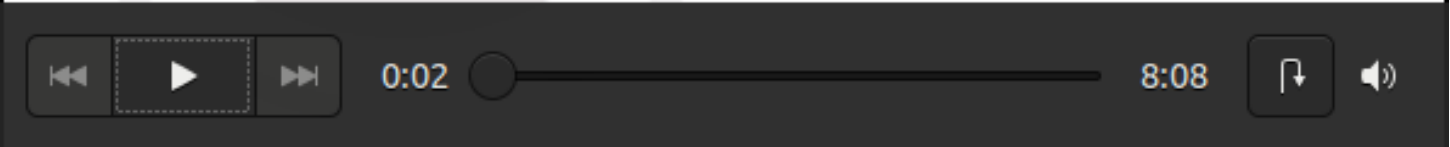
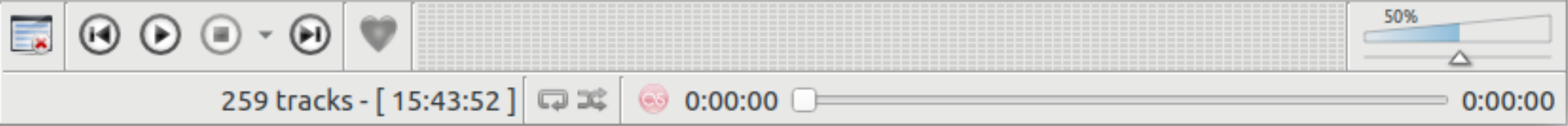
We would also like to pass on your details to our partners or approved suppliers so that they may contact you about their products and services. If you wish to receive such information, please tick the box



Continue

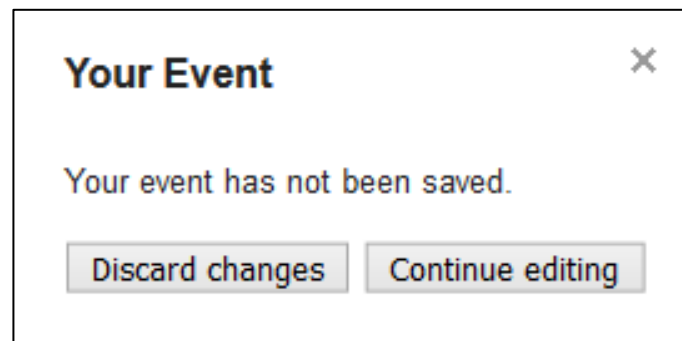
[cancel entire booking]

Good example: Media players all use similar button icons



Error prevention

- If possible, prevent errors from happening in the first place.
- Similar to visibility of system status, but specifically involves preventing an error from happening.
- Example: if the user needs to select 3 things, don't wait till the next screen to tell them that they have selected 4.
- Why
 - Users are not machines, they do not always perceive all the information available and they can temporarily forget things.
 - Computers are really good at using all the information available and remembering the last few things.



Good example:
ATMs give money after the card has
been removed to
prevent card-loss
errors.



Good example:
Drop down
prevents users
from entering
impossible dates.
CVV field also
checks for
numbers when
typing.


13:25

Enter Your Card Details

Credit or Debit Card

Enter Your Card Number *

Expiry Date *: Valid From:



[What is this?](#)

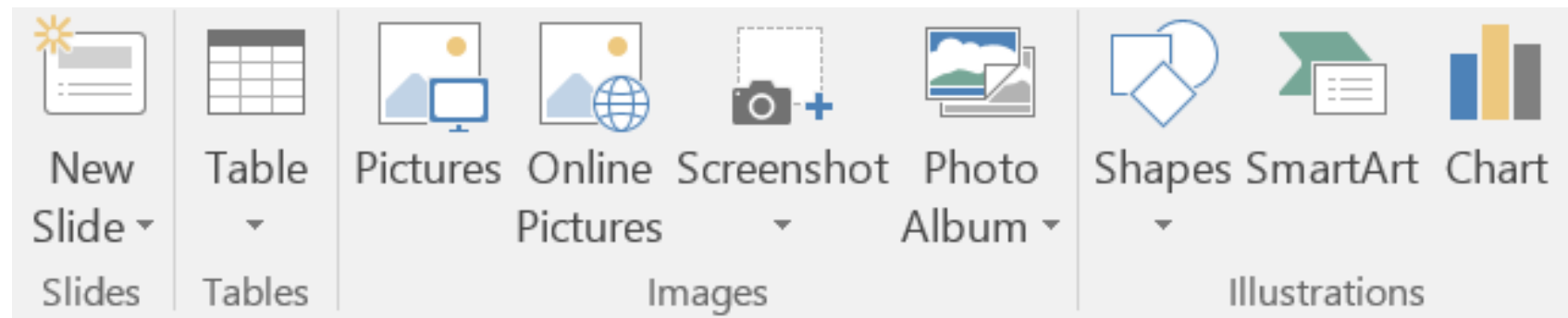
CVV (3 or 4 digit) *

[Continue](#)

The payment card details entered above are used only to verify that you are the cardholder. Your information will be secured using the latest encryption technologies in line with PCI data security standards, and will not be stored.

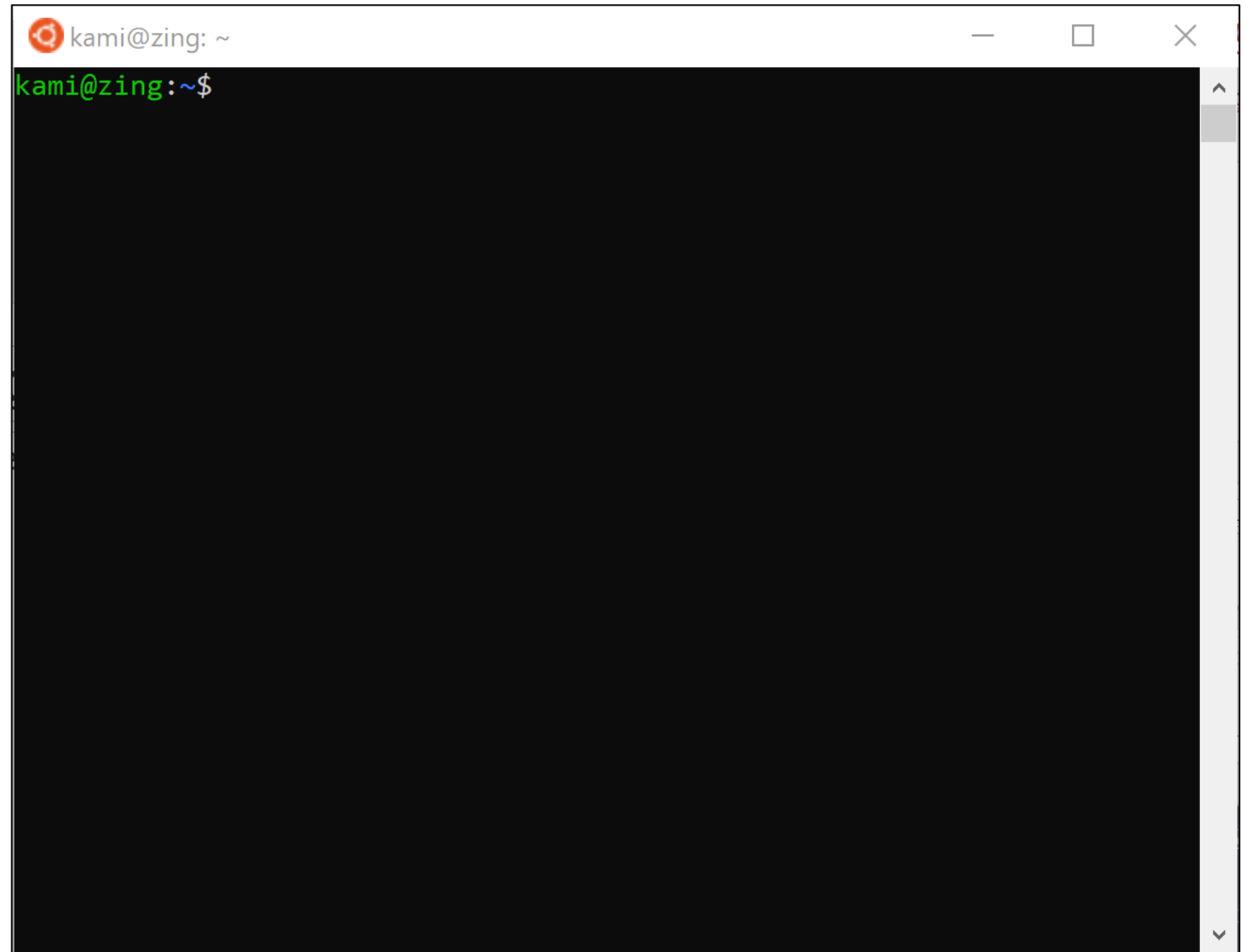
Recognition rather than recall

- Show all the options available to the user rather than expecting them to remember them all.
- Do not require users to remember information from one screen to the next.
- Why
 - People are less good at remembering (recall) than they are at recognizing (recognition).



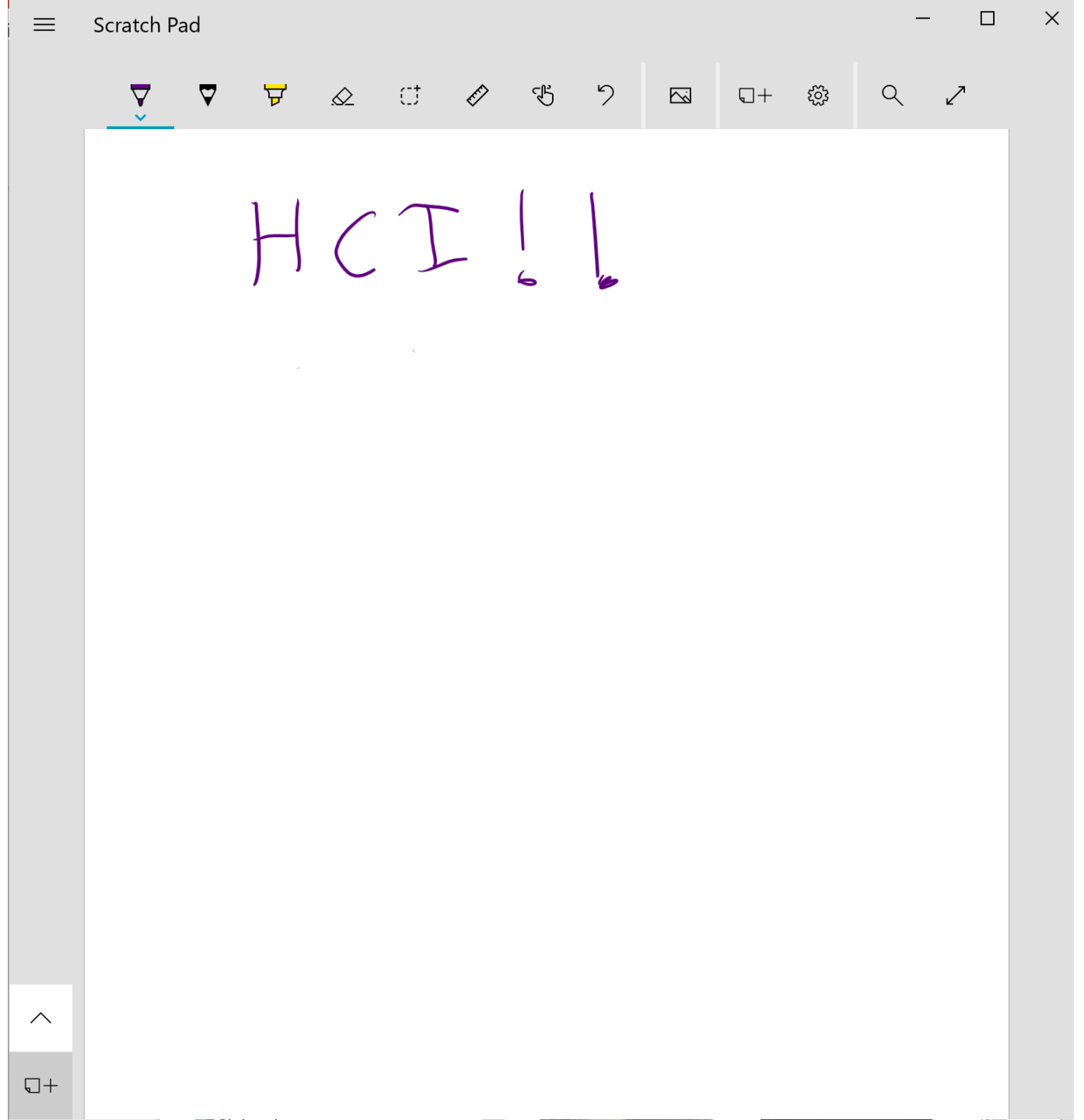
High recall
example. User
must memorize
each command.

(Excellent
flexibility though.)

A screenshot of a terminal window. The window title bar shows 'kami@zing: ~' and standard window control buttons (minimize, maximize, close). The terminal content shows the prompt 'kami@zing:~\$' in green text on a black background. The rest of the terminal is empty.




```
kami@zing:~$
```

Good example: all the main options are visible on the screen, user can recognize what they need rather than needing to recall where it is.



Complex example: how do I add a gift card?

The image shows the top navigation bar of the Amazon.co.uk website. On the left is the Amazon logo with ".co.uk". To its right is the delivery location: "Deliver to Kami Edinburgh EH8 9". A search bar contains the text "Amazon Devices" and has a magnifying glass icon. Further right are the flags for the United Kingdom, the text "Hello, Kami Account & Lists", and "Returns & Orders". On the far right is a shopping basket icon with the number "2" and the word "Basket". Below the search bar is a horizontal navigation menu with the following items: "All", "Grocery", "Buy Again", "Gift Cards & Top Up", "Toys & Games", "Free Delivery", "Vouchers", "Health & Personal Care", "Shopper Toolkit", "Books", "Pet Supplies", and "Beauty". Below this menu is a secondary navigation bar with the following items: "Amazon Devices", "Echo & Alexa", "Fire TV", "Fire Tablets", "Kindle E-Reader", "Home Security", "Smart Home", and "Accessories". At the bottom of this section is a blue banner with the text "Try Echo for 30 days. If you don't love it, send it back for a refund." and a "Learn more" link with a right-pointing arrow.

amazon.co.uk Deliver to Kami Edinburgh EH8 9 Amazon Devices   Hello, Kami Account & Lists Returns & Orders  Basket

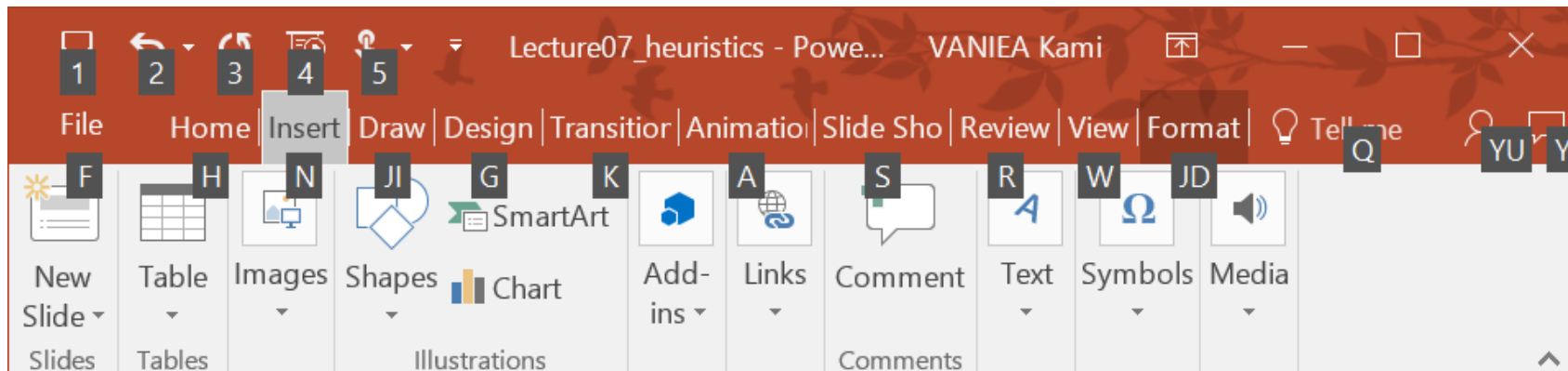
All Grocery Buy Again Gift Cards & Top Up Toys & Games Free Delivery Vouchers Health & Personal Care Shopper Toolkit Books Pet Supplies Beauty

Amazon Devices Echo & Alexa Fire TV Fire Tablets Kindle E-Reader Home Security Smart Home Accessories

Try Echo for 30 days. If you don't love it, send it back for a refund.
[Learn more](#)

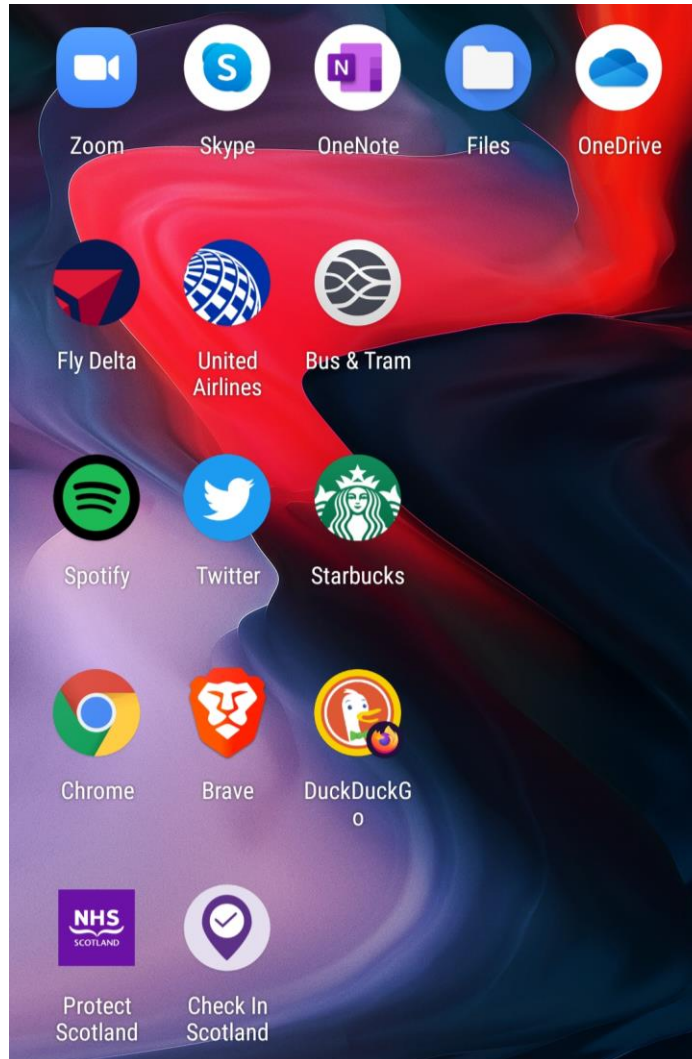
Flexibility and efficiency of use

- Experts should have a way to use the interface faster or more efficiently
- Design should have accelerators like keyboard shortcuts to allow skilled users to move faster
- Why
 - Using the mouse is MUCH slower than the keyboard. Users who know what they want should be able to find it quickly and efficiently

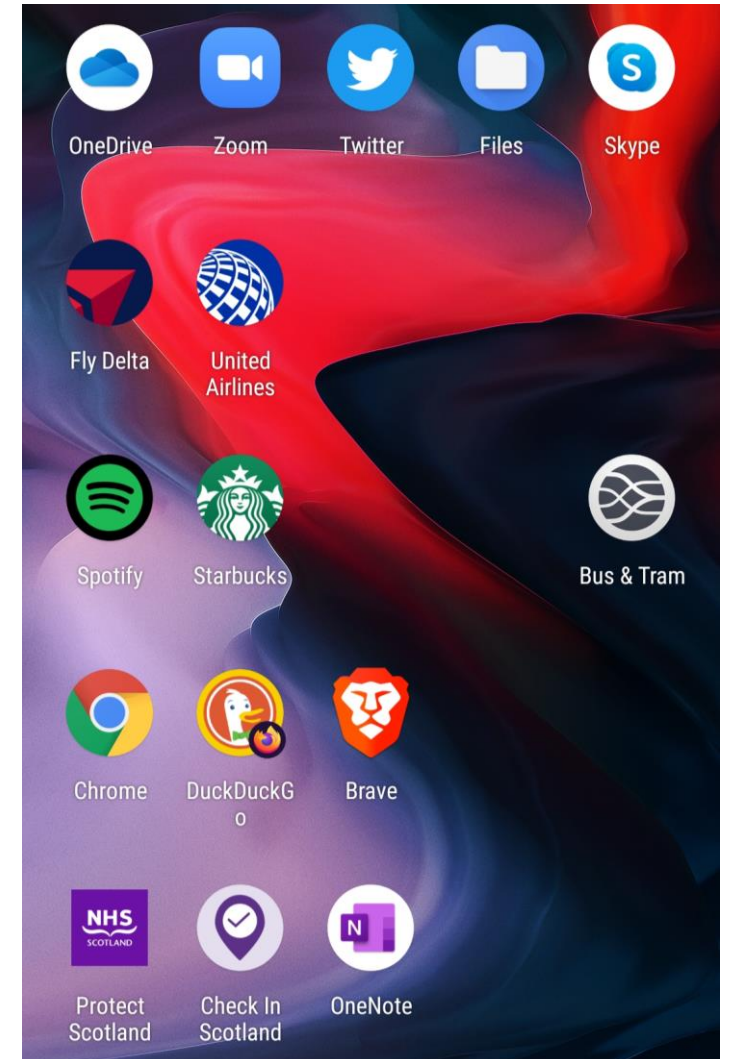


Good example:
app positioning on
home screens is up
to the user on
Android. New
screen “pages” can
also be created.

Ordered by function



Ordered by color



Aesthetics and minimalist design

- Get rid of clutter
- Easier to see things when there are not piles of other things in the way
- Why
 - The more things there are to look at, the harder it is for a user to process the data

Pita sign is busy and unorganized making it challenging to find information.

Bakery sign shows information in two languages while still making information clear.



Good example: clean, clear what user should do

Google

Google Search

I'm Feeling Lucky

Poor example: busy, lots of links everywhere

Make Yahoo! your home page [Try the all-new Yahoo! home page](#)

Finance | Music | Tech | **YAHOO!** | Mail | My Yahoo! | Messenger

Select Category: **Web** | Images | Video | Audio | Directory | Local | News | Shopping

Search the Web: **Yahoo! Search** [Advanced](#) [My Web](#) [Ad Programs](#)

[Yahoo! Answers: Ask a question | Answer questions](#)

Sneak Preview: The all-new Yahoo! home page. Check it out today.

Check your mail status: [Sign In](#) Free mail: [Sign Up](#)

360°	Horoscopes	Music	Shopping
Autos	HotJobs	My Yahoo!	Sports
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Groups	Maps	Photos	Yellow Pages
Health	Movies	Real Estate	All Y! Services...

Yahoo! Health [Weight Loss Advice](#)
Check your weight, pick a diet, get expert advice, find recipes.

In the News 12:14am, Tue May 16

- Bush to send up to 6,000 troops to border
- Pentagon discloses list of Gitmo detainees
- U.S. to restore diplomatic ties with Libya
- EU urges U.S. to cut more farm subsidies
- Recent trials bring victims' statements to life
- Health clubs making push to be 'senior-friendly'
- Julia Roberts a long-shot for Tony Award
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Weather

Enter City or U.S. Zip Code **Go**

Save location on this page

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Entertainment [» More Entertainment](#)

[Naomi's new role](#)
• Naomi Watts joins U.N. fight against AIDS
• Jennifer Garner says 'Alias' had a good run
• Alice Cooper gets key to namesake city
• Launch the premiere of Y! Tech's 'Hook Me Up'

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[What's life like inside a maximum security prison? Moussaoui's fate spurs Supermax searches. More...](#)
Popular Supermax Searches
1. Supermax Prisons 3. Inside Supermax
2. Colorado Supermax 4. Supermax Prison Pics

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Arts	Culture	Health	Reference
Business	Education	News	Regional
Computers	Entertainment	Recreation	Science

More Yahoo! Services [» More Yahoo! Services](#)

Auctions	Chat	Education	Members
Calendar	Classifieds	Greetings	Tickets

Poor example: lots of information and it is poorly organized (good use of colors though).



Help users recognize, diagnose, and recover from errors

- Error messages should be clear, written in plain language, explain the problem, give constructive advice on how to solve the problem.
- Why
 - Errors should only be shown to users when the system can no longer make a choice on their behalf. The error needs to be clear about what it is the user needs to do or provide input on.

Poor example:



Better example: information about what the password is and how to fix it.

OpenWrt

No password set!

There is no password set on this router. Please configure a root password to protect the web interface and enable SSH.

[Go to password configuration...](#)

Authorization Required

Please enter your username and password.

Username

Password



Login



Reset

Powered by [LuCI 15.05-142-gb6330a1 Release \(git-15.363.78009-956be55\)](#) / OpenWrt Chaos Calmer 15.05.1

Oopse... I meant to login and clicked the wrong link.

Designer provided a link back to the sign in though because the anticipated this error. (Good example.)

amazon.co.uk

Create account

Your name

Email

Password

i Passwords must be at least 6 characters.

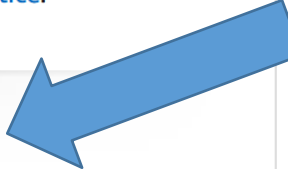
Re-enter password

Create your Amazon account

By creating an account you agree to Amazon's [Conditions of Use & Sale](#). Please see our [Privacy Notice](#), our [Cookies Notice](#) and our [Interest-Based Ads Notice](#).

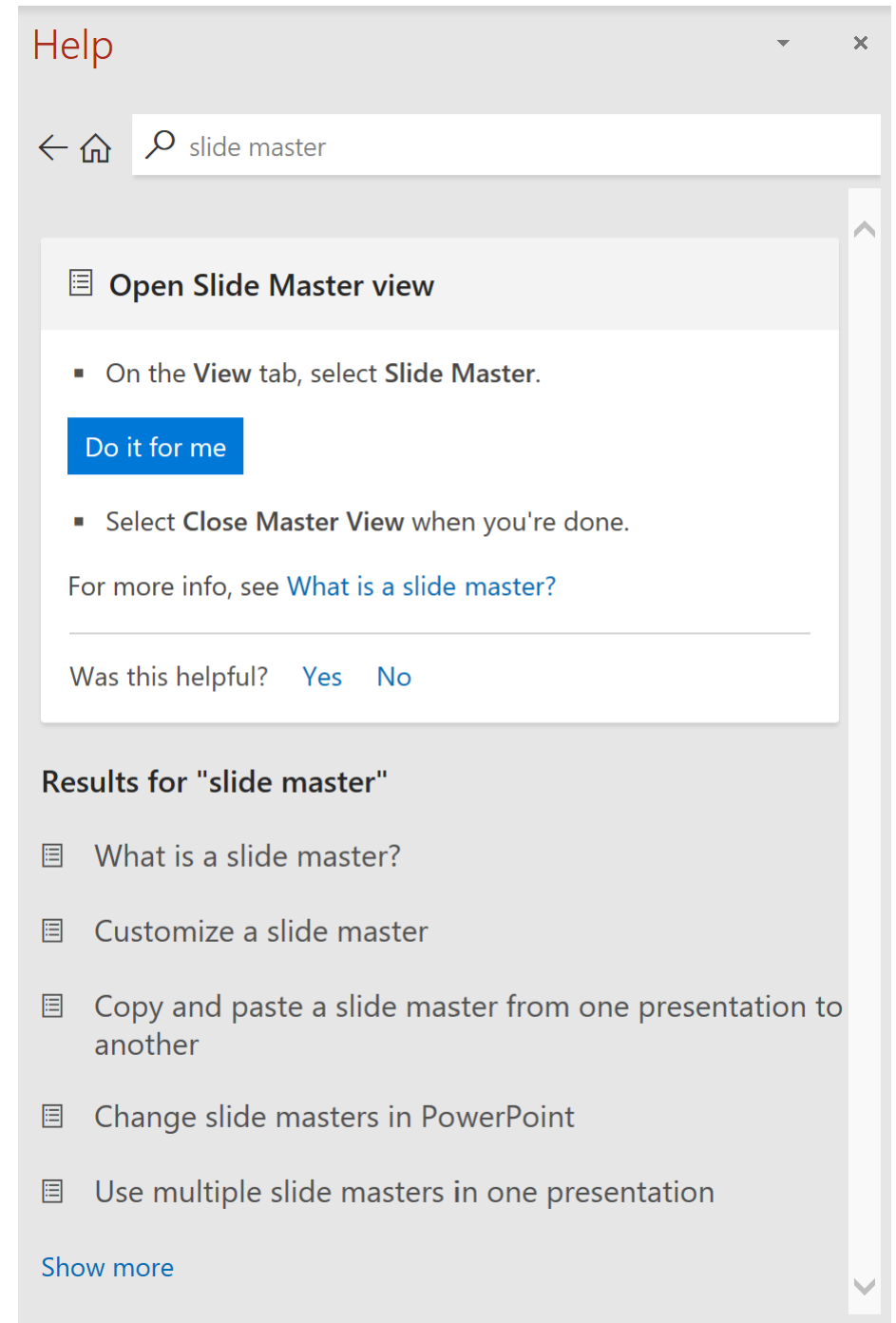
Already have an account? [Sign in](#) ▶

Buying for work? [Create a free business account](#) ▶



Help and documentation

- Unless the system is extremely simple, some people will need help documentation.
- Provide guidance at the right moment when the user requires it.
- Why
 - People learn about things in different ways. Some people learn by playing around and pushing buttons, other people learn by reading. The system needs to support all people.



Good help example, poor affordance




Good example: provide guidance where needed

Enter Your Card Details

Credit or Debit Card

Enter Your Card Number *

Expiry Date *: Valid From:


[What is this?](#)

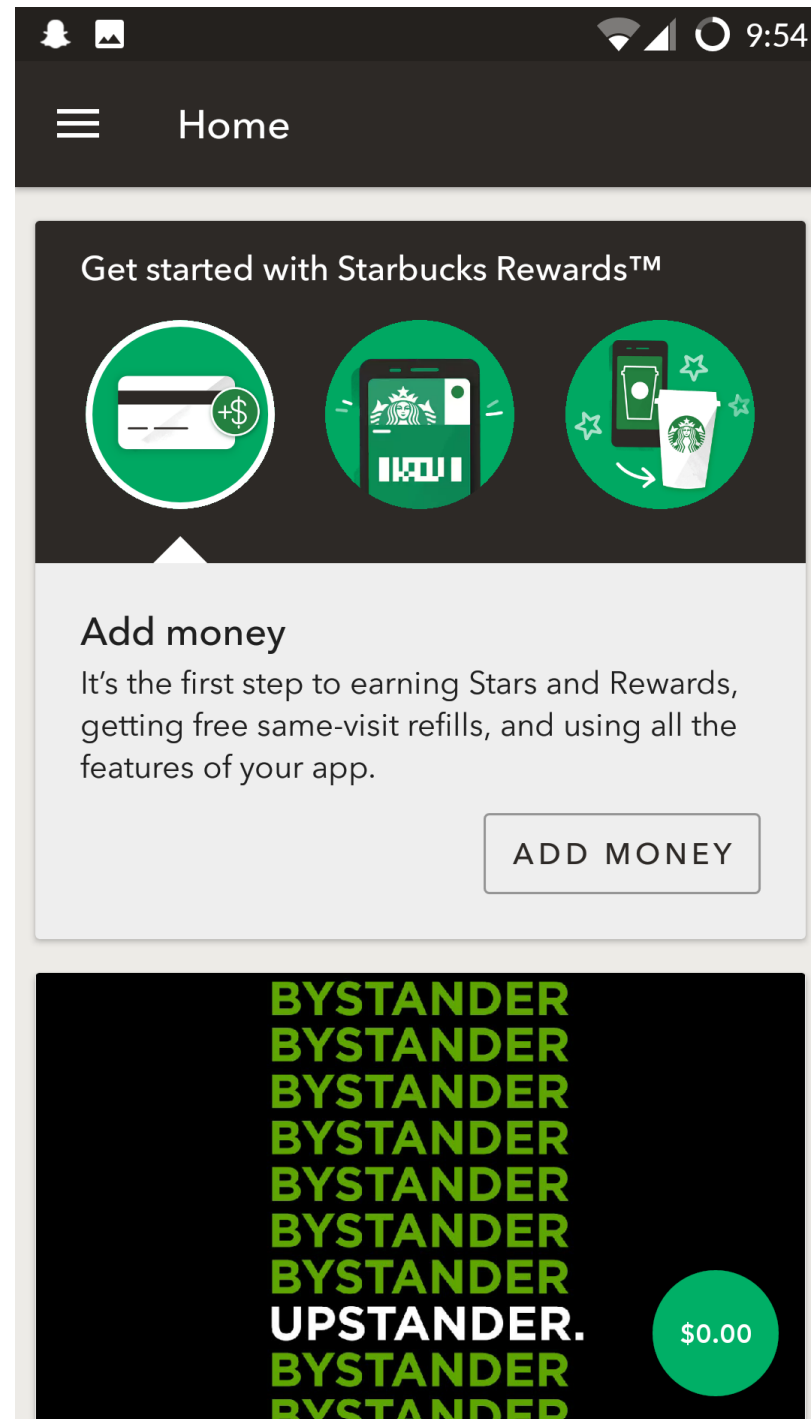
CVV (3 or 4 digit) *

Continue

The payment card details entered above are used only to verify that you are the cardholder. Your information will be secured using the latest encryption technologies in line with PCI data security standards, and will not be stored.



Good example:
clear instructions
on how to add
money to the app
provided right
after installation.



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