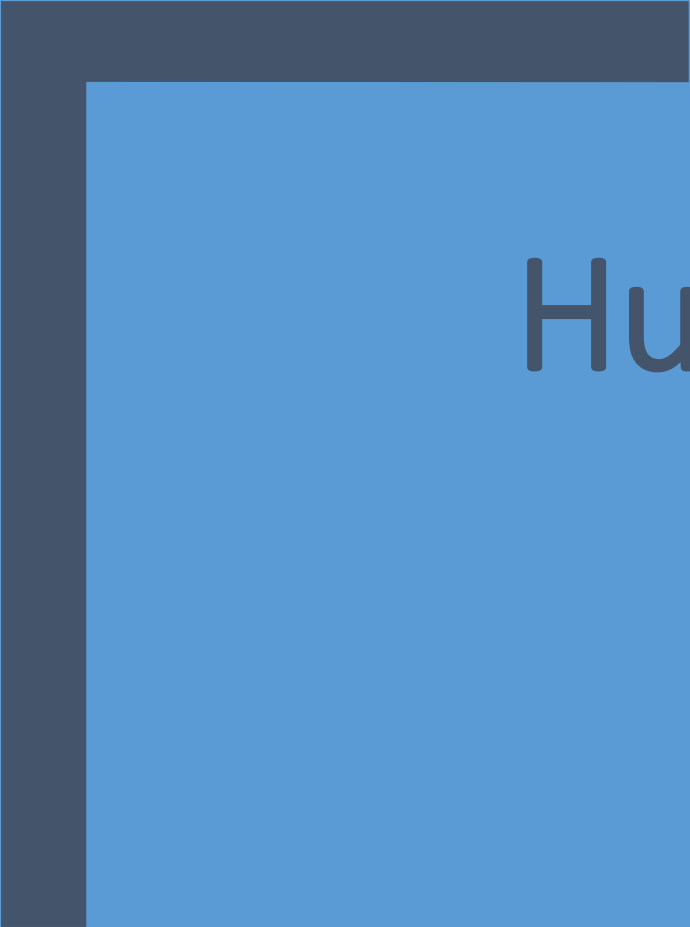




Human-Computer Interaction: Heuristics

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

Google

Search Calendar

Q

←

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

Add

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 Google logo, a search bar, and action buttons: a back arrow, a red 'SAVE' button, 'Discard changes', 'Delete', and a 'More Actions' dropdown. The event title 'Hci QandA' is entered in a text box. Below it, the date and time are set to '10/6/2016' from '2:00pm' to '4:00pm' on '10/6/2016' in '(GMT+01:00) London' time zone. There are checkboxes for 'All day' and 'Repeat...'. Below these are 'Event details' and 'Find a time' buttons. 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' dropdown is set to 'Kami Vaniea'. A large 'Description' text area is empty. An 'Attachment' section has an 'Add attachment' link. A 'Notifications' section is highlighted with a red rectangle; it shows a dropdown set to 'Notification', a value of '10', and a unit of 'minutes', followed by a close 'x' button. To the right, the 'Add guests' section has a text input for 'Enter guest email address' and an 'Add' button. Below that, 'Guests can' settings are shown: 'modify event' (unchecked), 'invite others' (checked), and 'see guest list' (checked). At the bottom, 'Show me as' is set to 'Busy' (selected over 'Available'), and 'Visibility' is set to 'Calendar default' (selected over 'Public' and 'Private'). A note states: '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'. A 'Publish event' link is at the very bottom.

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 x

Add a notification

Add guests

Enter guest email address Add

Guests can

- ☐ modify event
- ☒ invite others
- ☒ see guest list

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](#)

Is the
reminder
saved?



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

Video call

[Add video call](#)

Calendar

Kami Vaniea 

Description

Attachment

[Add attachment](#)

Event color























Notifications

Notification 

10

minutes 



[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

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. 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 is the 'Event details' section with a 'Find a time' button. The 'Where' field is empty. There is a 'Video call' section with an 'Add video call' link. The 'Calendar' dropdown is set to 'Kami Vaniea'. The 'Description' field is empty. There is an 'Attachment' section with an 'Add attachment' link. The 'Event color' section shows a row of color swatches with the first one selected. The 'Notifications' section shows a notification set for 10 minutes before the event, with an 'Add a notification' link. The 'Show me as' section has radio buttons for 'Available' and 'Busy', with 'Busy' selected. The 'Visibility' section has radio buttons for 'Calendar default', 'Public', and 'Private', with 'Calendar default' selected. A warning dialog box titled 'Your Event' is centered on the screen, displaying the message 'Your event has not been saved.' and two buttons: 'Discard changes' and 'Continue editing'. To the right of the dialog, there is an 'Add guests' section with an input field for 'Enter guest email address' and an 'Add' button. Below that is a 'Guests can' section with checkboxes for 'modify event', 'invite others' (checked), and 'see guest list' (checked).

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](#)

Your Event X

Your event has not been saved.

Discard changes Continue editing

Add guests

Enter guest email address Add

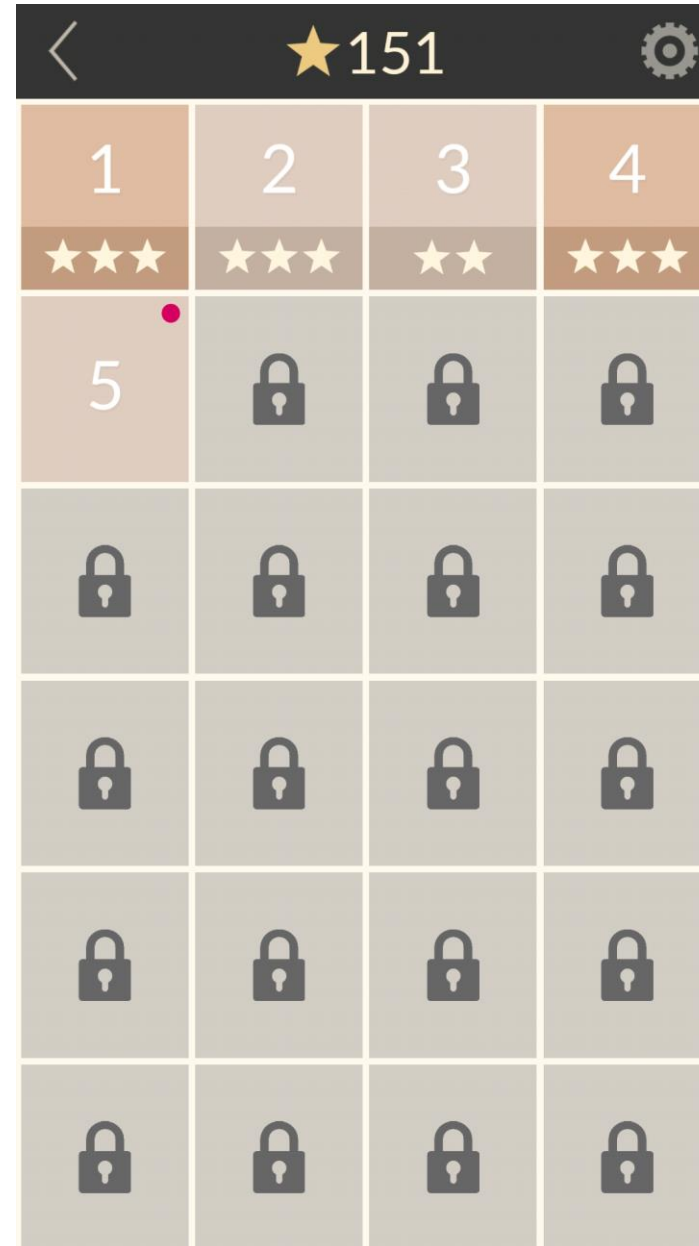
Guests can

☐ modify event

☒ invite others

☒ see guest list

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.

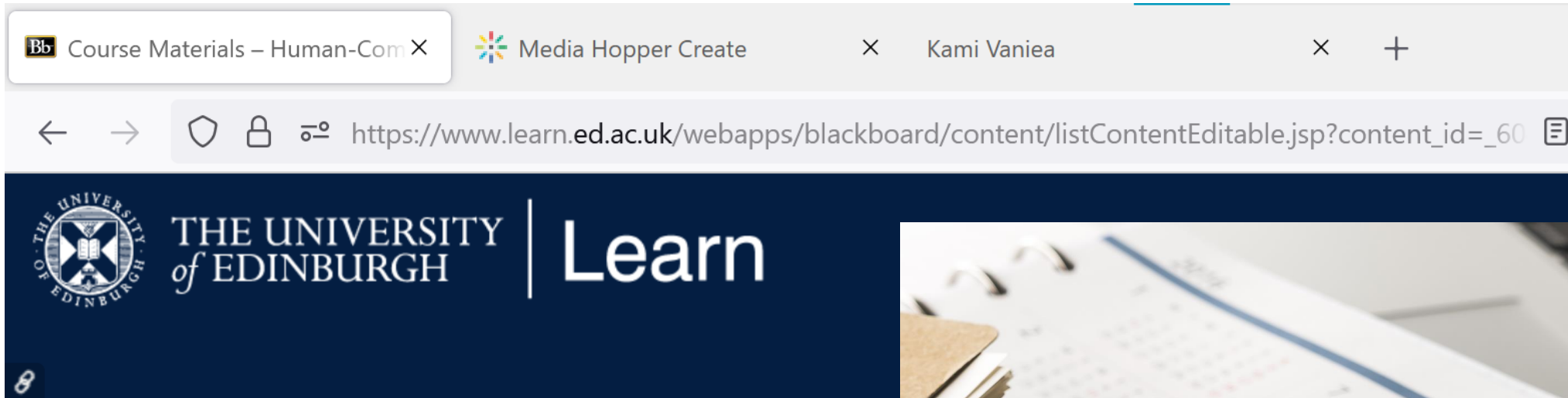
**Knobs match
burner positions**



**Knobs not aligned
with “real world”**



Notebook “tabs” -> browser “tabs”



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

AMERICAN EXPRESS

He

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

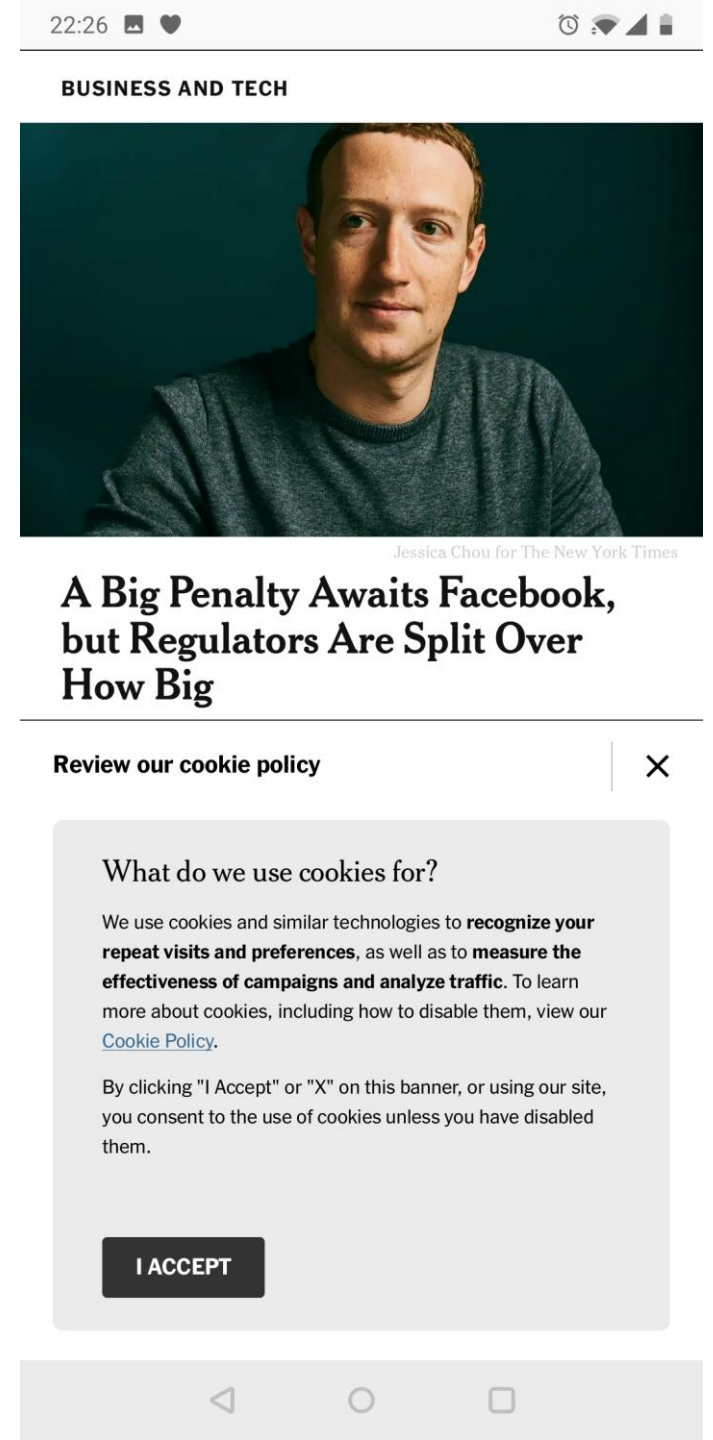
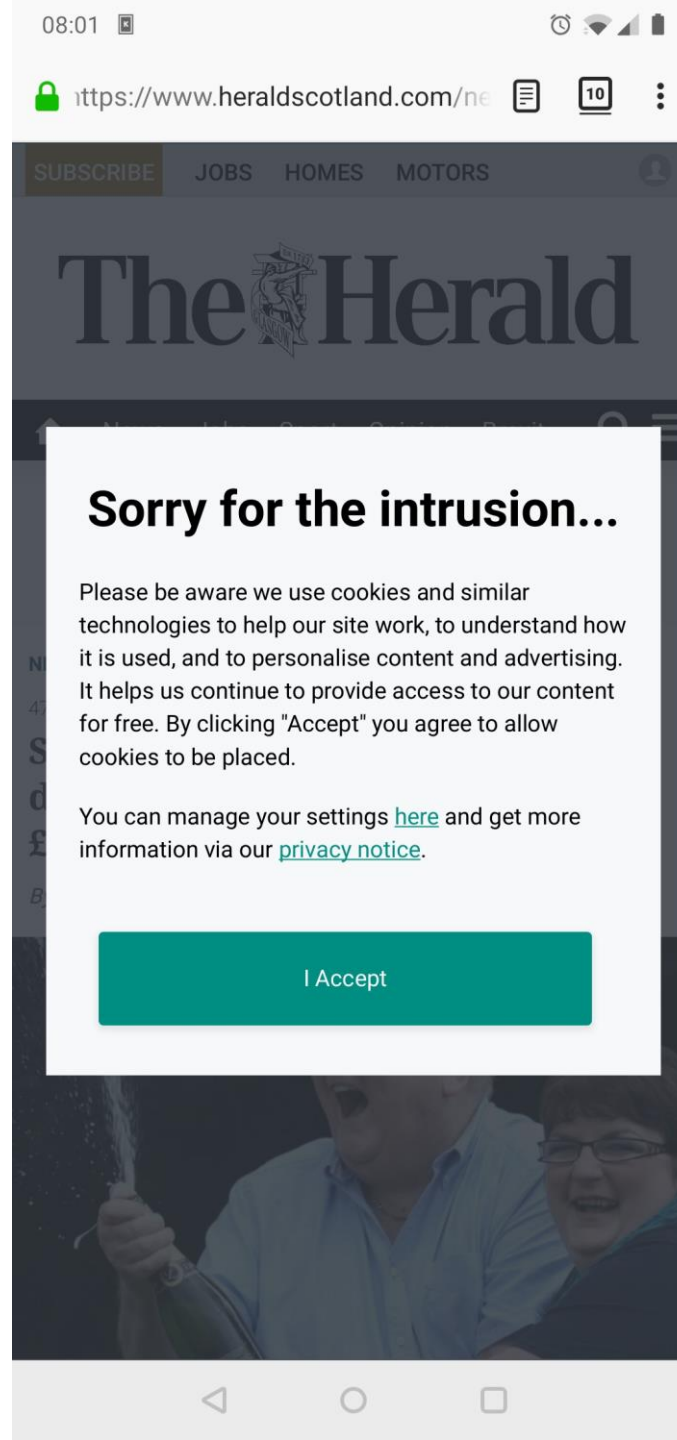
Confirm

User control and freedom

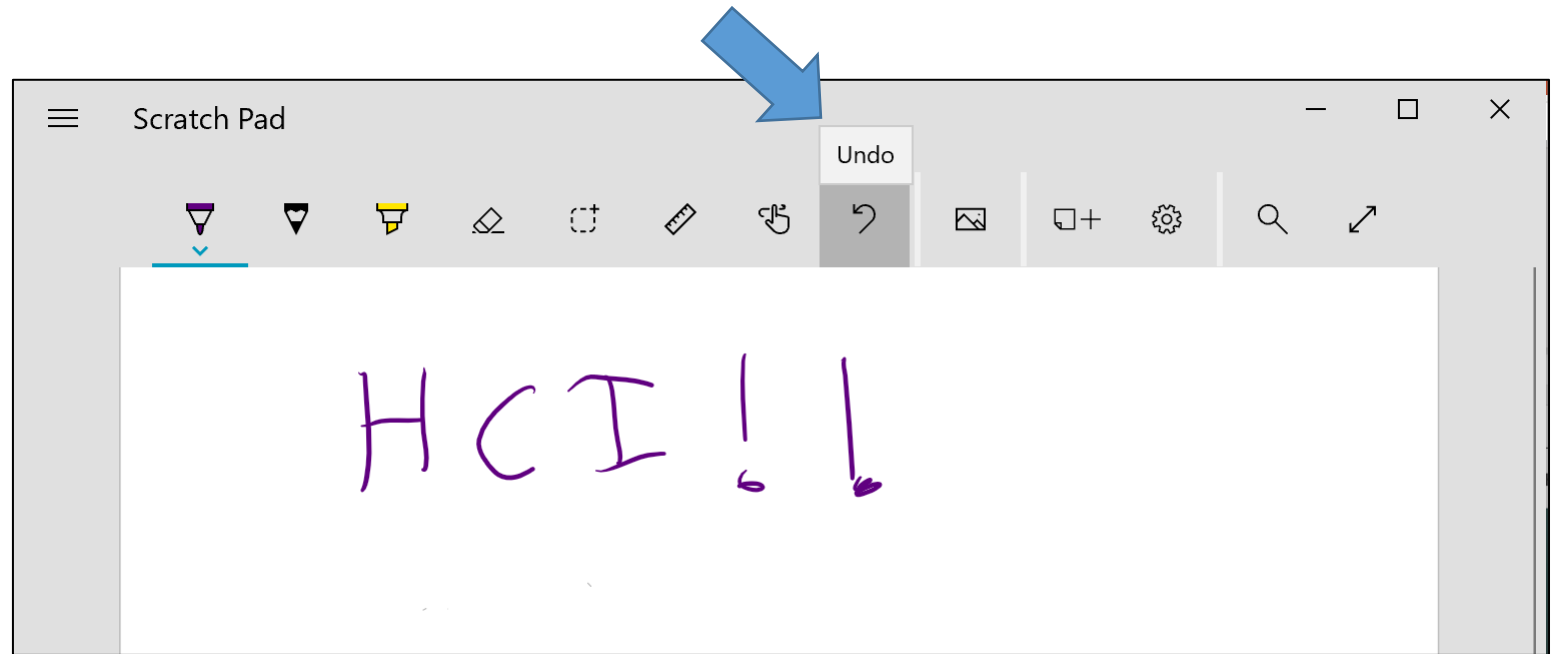
- Allow the user to have control of the interaction. Users should be able to undo actions, exit from any sequence of actions, and not be forced into a series of actions.
- Why
 - Users make errors sometimes.
 - They need the ability to go back and correct the errors.
 - Users need a way to “exit”.

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

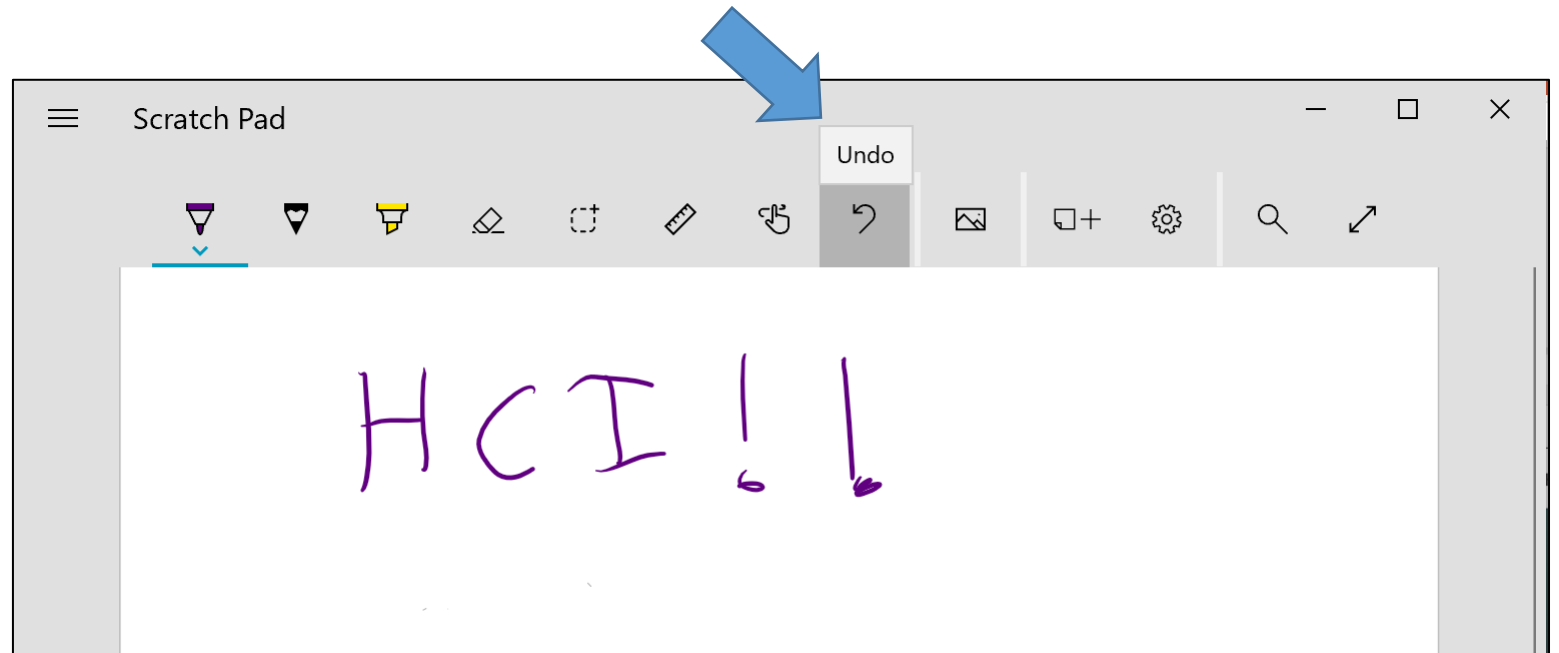
User has no
choices and is
forced into
action.



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.



Communicating with you

BCS, The Chartered Institute for IT, may send you information electronically (including by email, or telephone) about its services and products. If you do not wish to receive such information in this way, please tick the box ☐

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.

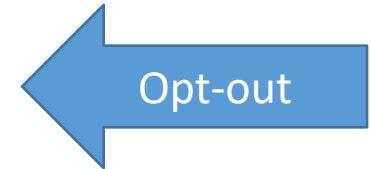
Poor example: Stop signs are always red....



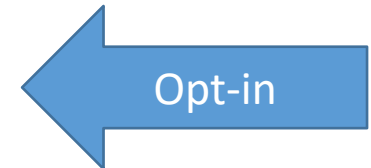
Poor example: tick boxes mean opposite things

Communicating with you

BCS, The Chartered Institute for IT, may send you information electronically (including by email, or telephone) about its services and products. If you do not wish to receive such information in this way, please tick the box ☐



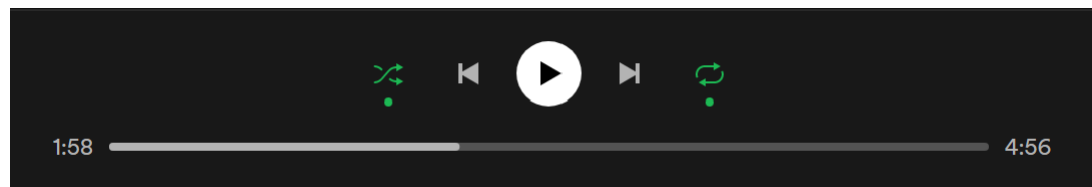
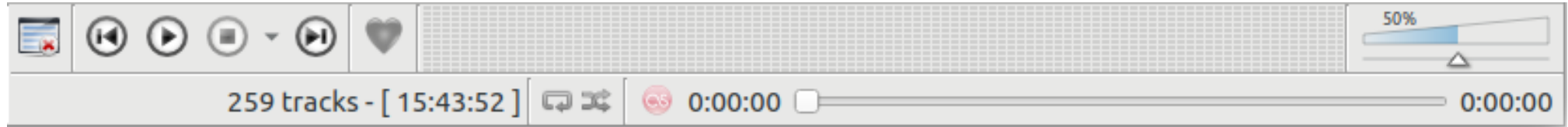
We would also like to pass on your details to our partners or approved suppliers so that they may contact you about their products and services. If you wish to receive such information, please tick the box ☐



Continue

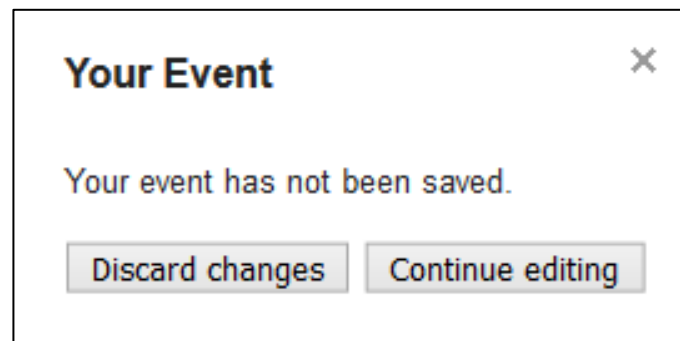
[\[cancel entire booking\]](#)

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

4G

Enter Your Card Details

Credit or Debit Card

Enter Your Card Number *

Expiry Date *: Valid From:

CVV (3 or 4 digit) *

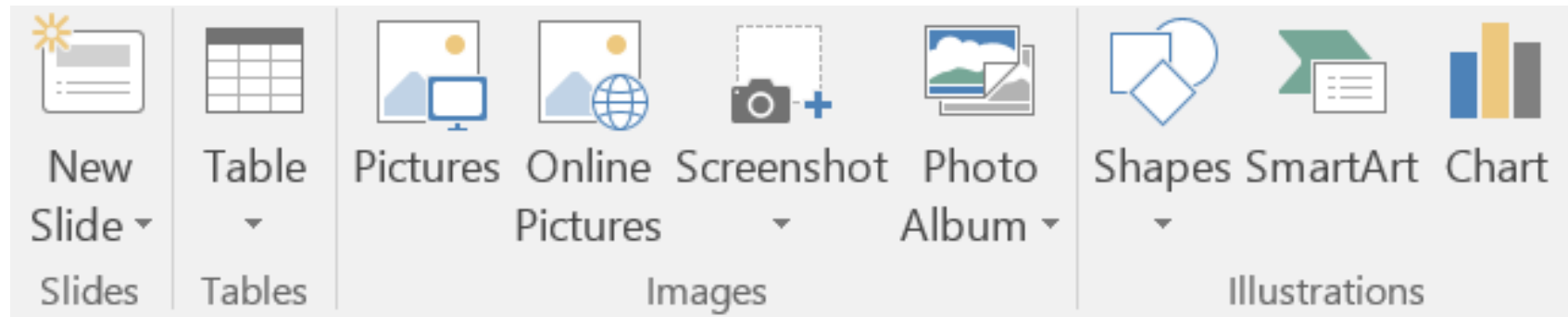
[What is this?](#)

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.

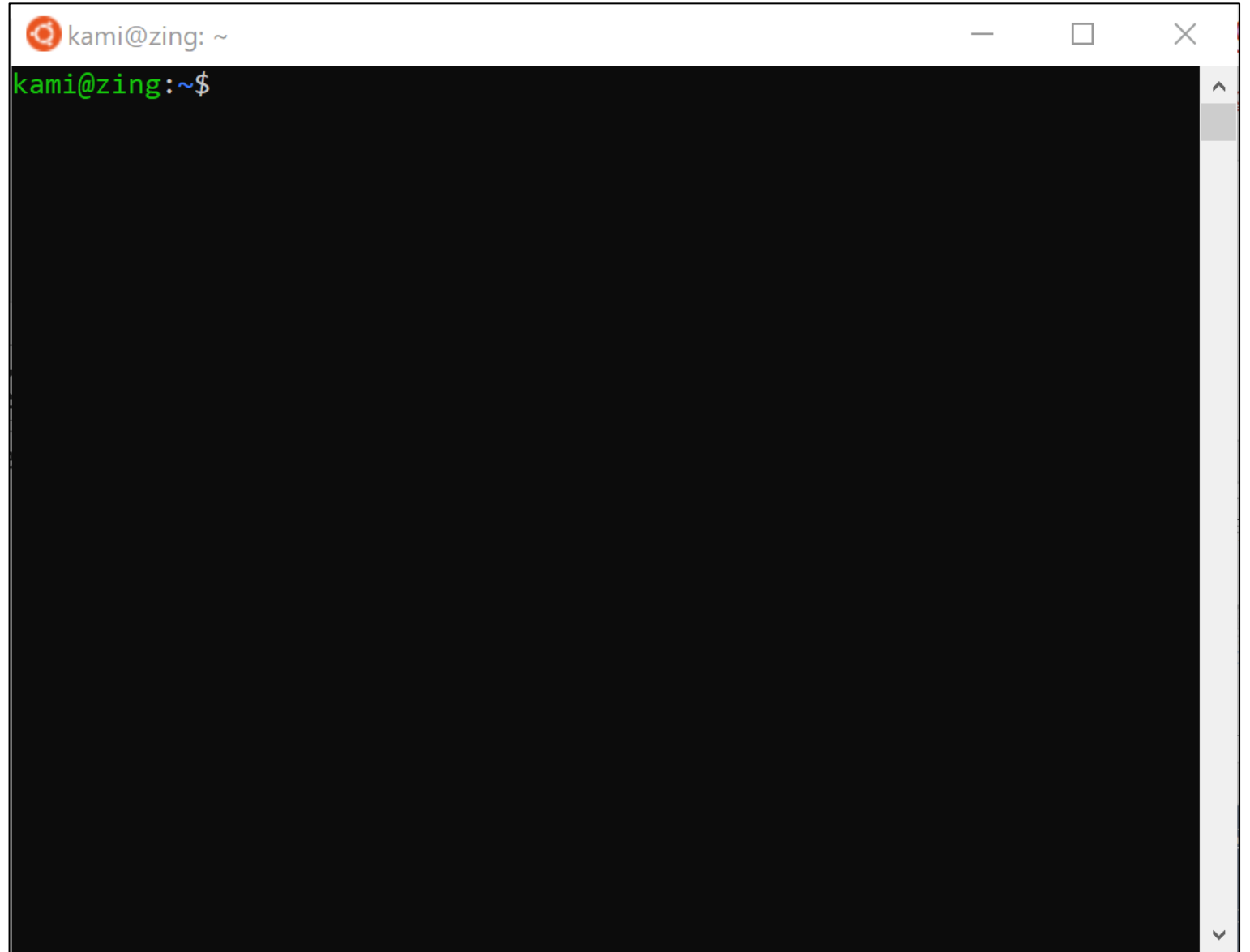
Recognition rather than recall

- 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).

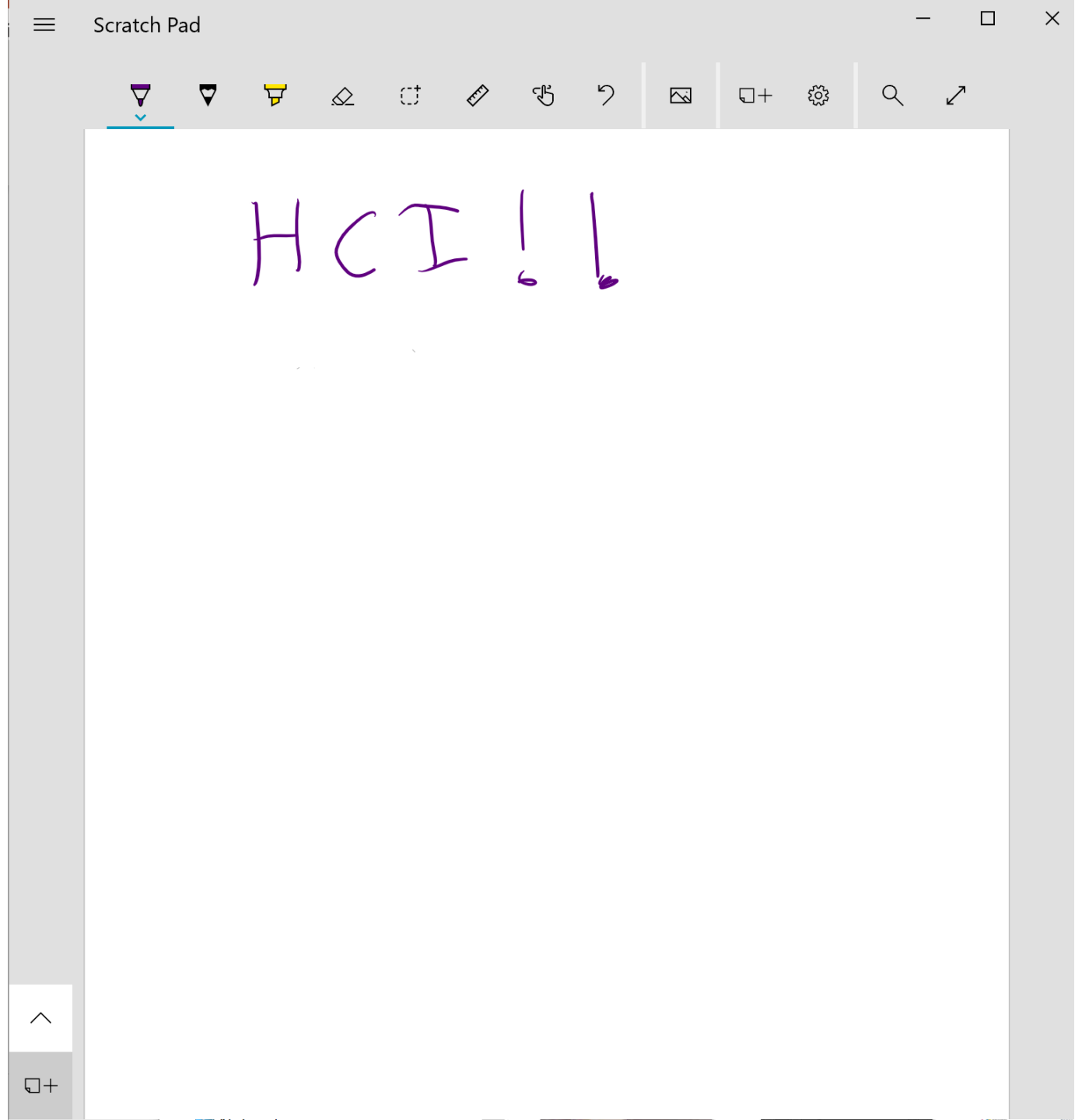


High recall
example. User
must memorize
each command.

(Excellent
flexibility though.)



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 section of the Amazon.co.uk website. At the top left is the Amazon logo with ".co.uk". To its right is the delivery location: "Deliver to Kami Edinburgh EH8 9". Next is a search bar with "Amazon Devices" entered and a magnifying glass icon. To the right of the search bar are links for "Hello, Kami Account & Lists", "Returns & Orders", and a shopping basket icon with a "2" indicating items. Below this is a horizontal navigation bar with links: "All", "Grocery", "Buy Again", "Gift Cards & Top Up", "Toys & Games", "Free Delivery", "Vouchers", "Health & Personal Care", "Shopper Toolkit", "Books", "Pet Supplies", and "Beauty". Below the navigation bar is a section for "Amazon Devices" with sub-links: "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.

amazon.co.uk Deliver to Kami Edinburgh EH8 9 Amazon Devices

Hello, Kami Account & Lists Returns & Orders Basket

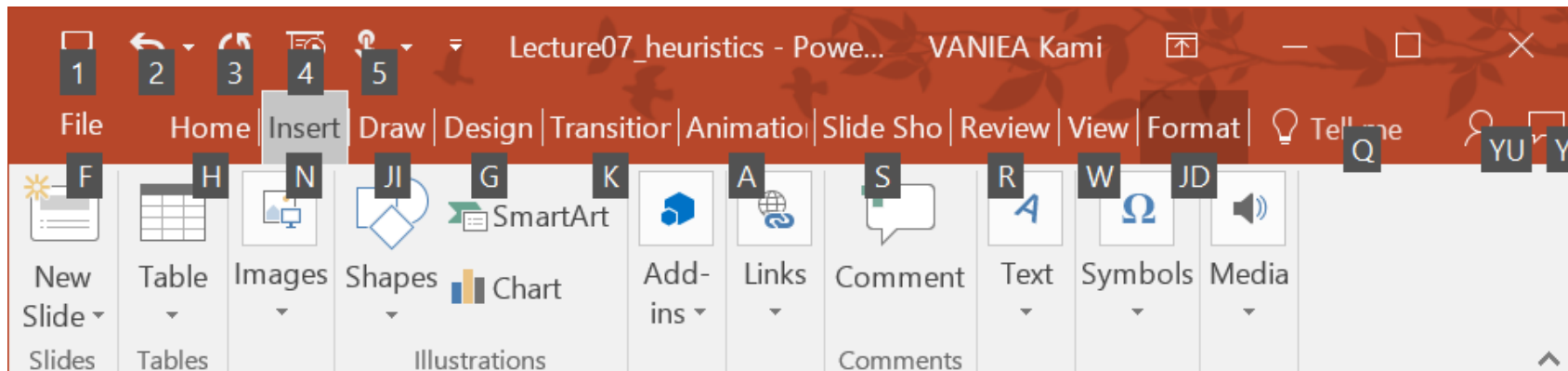
All Grocery Buy Again Gift Cards & Top Up Toys & Games Free Delivery Vouchers Health & Personal Care Shopper Toolkit Books Pet Supplies Beauty

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](#)

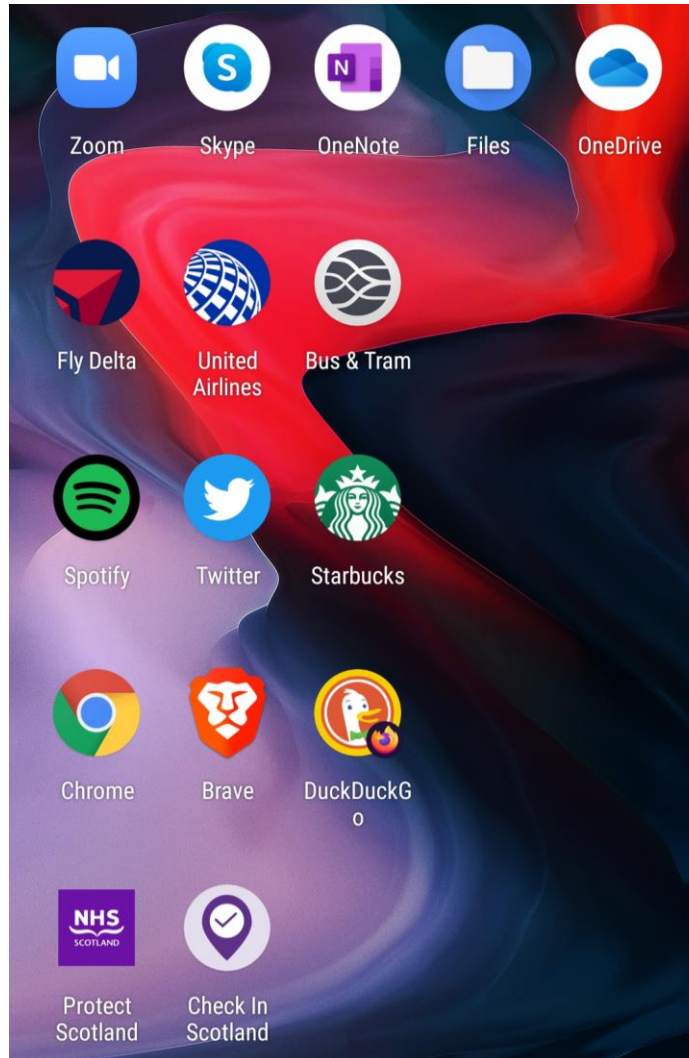
Flexibility and efficiency of use

- 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

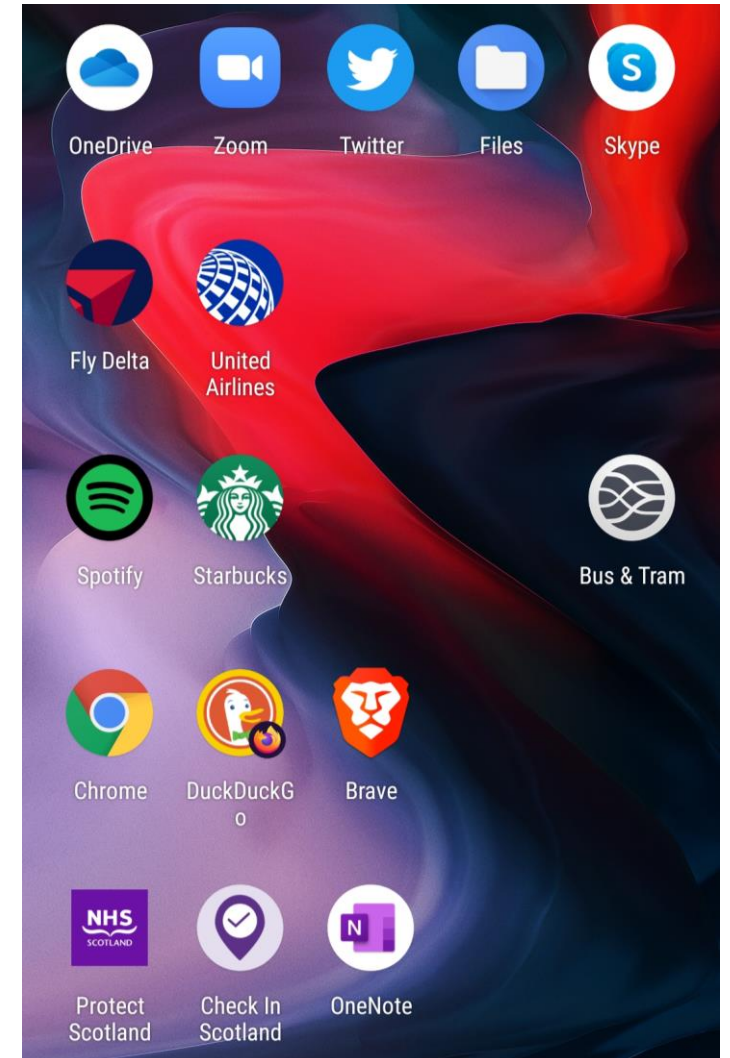


Good example:
app positioning on
home screens is up
to the user on
Android. New
screen “pages” can
also be created.

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

A large, rounded rectangular search bar with a thin gray border. On the left side of the bar is a small, faint magnifying glass icon.

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
Finance	Kids	News	Tech NEW
Games	Local	People Search	Travel NEW
GeoCities	Mail	Personals	TV
Groups	Maps	Photos	Yellow Pages
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It's where people ask & answer questions - for free!

How do you know you are in love?

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Domain Names	Search Listings

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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'

Buzz Log - What the world is searching for [» More Buzz](#)

 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

Yahoo! Web Directory [» More Yahoo! Web Directory](#)

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

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
- NBA · NHL · MLB · Golf · Tennis · Soccer

[News](#) · [Popular](#) · [Sports](#) · [Stocks](#)

Weather

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

☒ Save location on this page

Marketplace

 Get your degree in 1 year
Earn an Associate, Bachelor's or Master's degree online from top schools. [Start today.](#)

\$175,000 Mortgage for under \$857 per month - Free loan quote - Refinance today.

Blockbuster Online - DVDs to your door and 1 free in-store rental every week.

What's your child's learning style? - Take Sylvan's quick quiz to find out.

Yahoo! Advertising Solutions

Search Marketing	Local Ads
Sponsored Search	Publisher Network

[» More Advertising Solutions](#)

Yahoo! International

Spain	Mexico	Italy
Argentina	Y! en español	Brazil

[» See all Yahoo! international sites](#)

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](#).

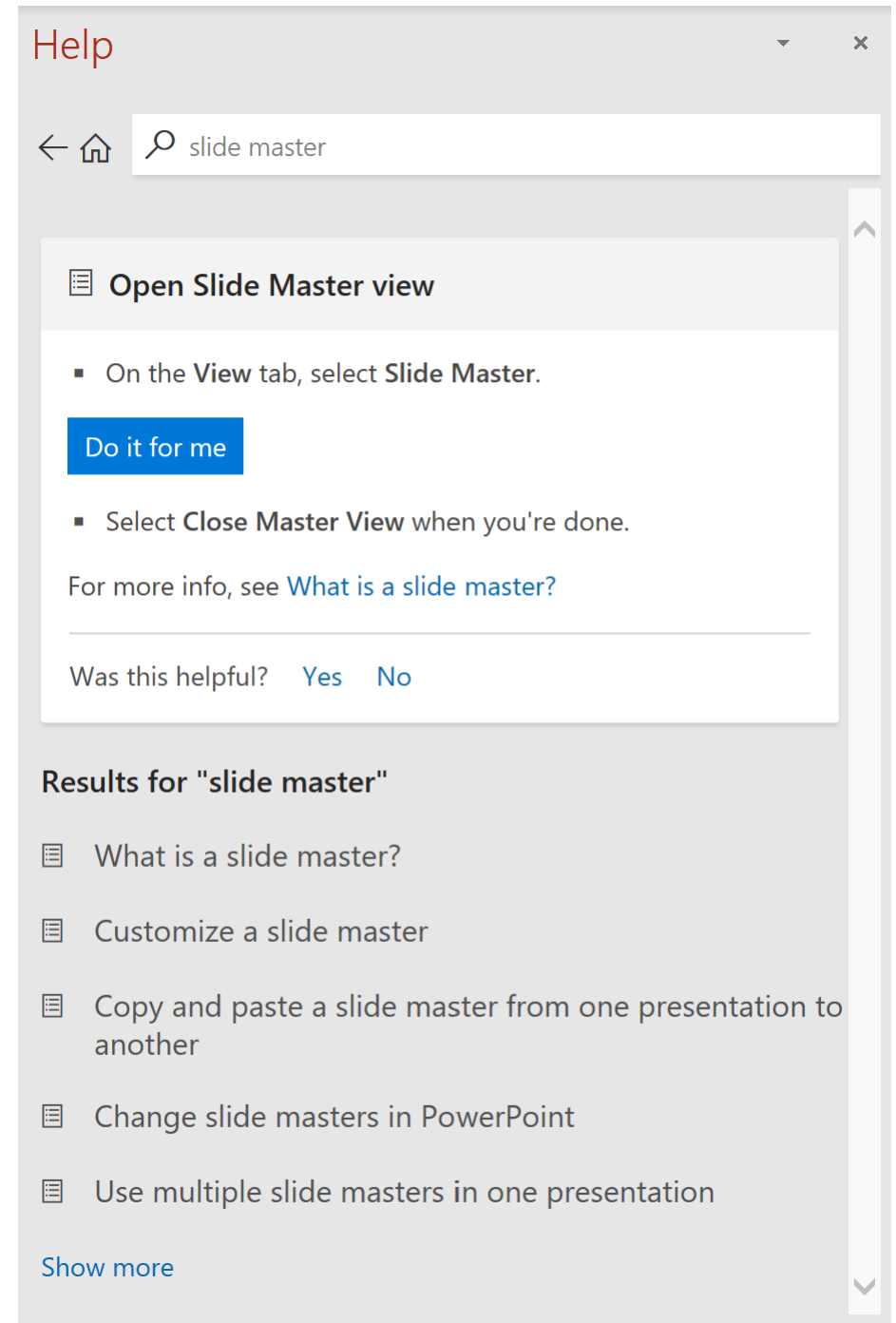
Already have an account? [Sign in](#) ▶

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:

CVV (3 or 4 digit) *

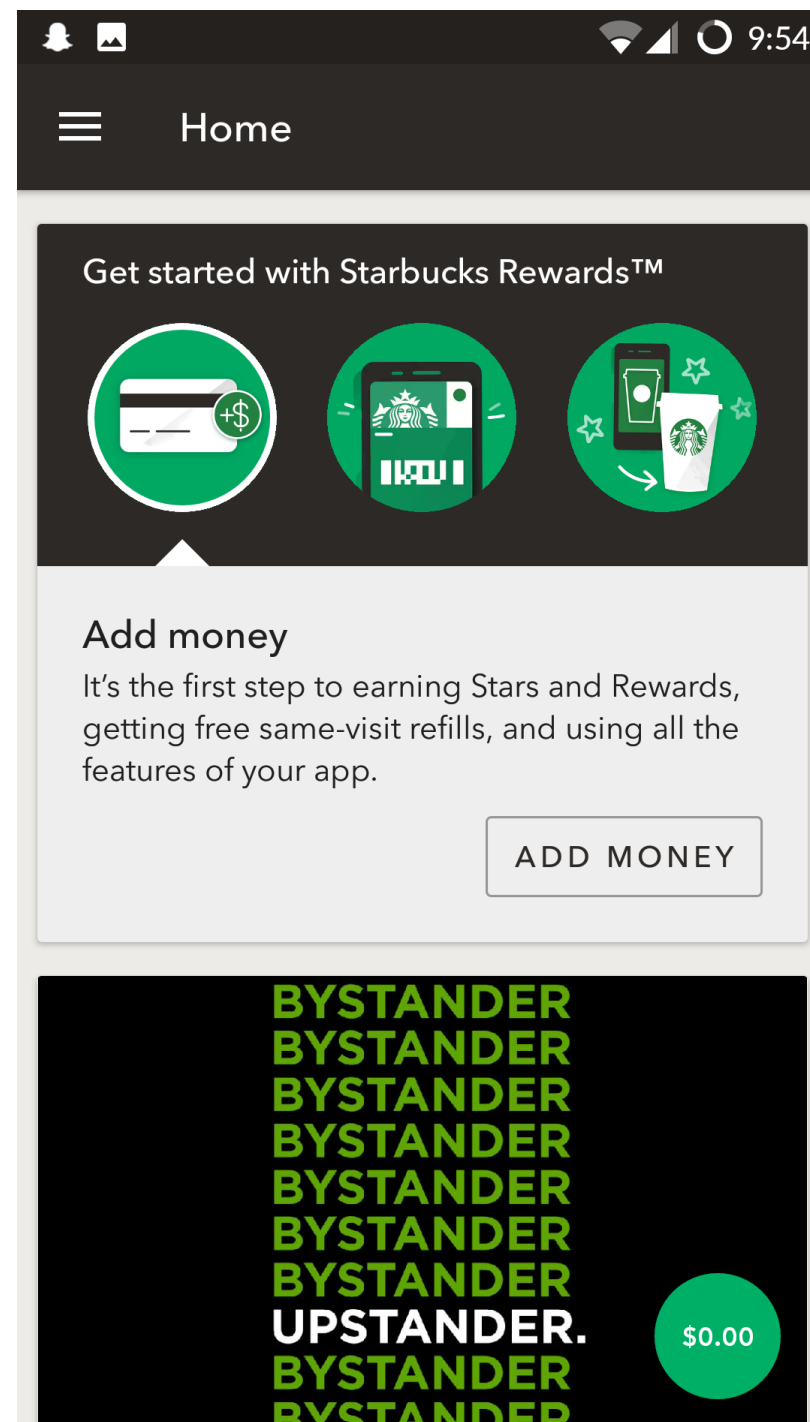
[What is this?](#)

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.



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
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Human-Computer Interaction: Nielsen's 10 Heuristics

Dr Kami Vaniea