Application GUI Design – Notes From a Toolkit Developer



stosb.com/talks

Tom Hacohen Samsung Electronics Open Source Group

tom.hacohen@samsung.com @TomHacohen



FOSDEM 2015

Essential features



- Essential features
- Nice to have features



- Essential features
- Nice to have features
- ▶ Niche features (<1% of the users)



Designing an Application | Identify the Application

What does it do?

- Essential features
- Nice to have features
- ▶ Niche features (<1% of the users)
- Remove all the non-essential features



CLI power users? Designers?



- CLI power users? Designers?
- Target environment



- CLI power users? Designers?
- Target environment
- Common demographics



- CLI power users? Designers?
- Target environment
- Common demographics
- Application specific classifications



- CLI power users? Designers?
- Target environment
- Common demographics
- Application specific classifications
- ► Userbase \neq you



Adapt feature list according to your audience





- Adapt feature list according to your audience
- Keep focus on the more important features





- Adapt feature list according to your audience
- Keep focus on the more important features
- Avoid creating complex UIs





- Adapt feature list according to your audience
- Keep focus on the more important features
- Avoid creating complex UIs
- Keep option lists (combo box) short, simple and if there's no choice, split to categories





Designing an Application $\ | \ \mbox{Beginning of the UI}$

Have a rough sketch

Make a general storyboard sketch



Designing an Application \mid Beginning of the UI

- Make a general storyboard sketch
- Have all the major interactions and features there



Designing an Application | Beginning of the UI

- Make a general storyboard sketch
- Have all the major interactions and features there
- Can be really rough it's more about the purpose of the "pages"



Designing an Application | Beginning of the UI

- Make a general storyboard sketch
- Have all the major interactions and features there
- Can be really rough it's more about the purpose of the "pages"



Designing an Application \mid Beginning of the UI

- Make a general storyboard sketch
- Have all the major interactions and features there
- Can be really rough it's more about the purpose of the "pages"





Designing an Application | Beginning of the UI Stick to the basics

► Don't bother with colour – harder and will be added later



Designing an Application | Beginning of the UI Stick to the basics

- Don't bother with colour harder and will be added later
- > Do not customise available widgets/patterns unless there really is no other way



Designing an Application | Beginning of the UI Stick to the basics

- Don't bother with colour harder and will be added later
- > Do not customise available widgets/patterns unless there really is no other way
- Develop it around the content content is king



Be purposefully simple



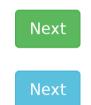


- Be purposefully simple
- Skeuomorphs are almost always bad





- Be purposefully simple
- Skeuomorphs are almost always bad
- Be consistent (easier when simple)





- Be purposefully simple
- Skeuomorphs are almost always bad
- Be consistent (easier when simple)
- Make it simple for your users don't create new usage patterns, and adhere to common ones







- Be purposefully simple
- Skeuomorphs are almost always bad
- Be consistent (easier when simple)
- Make it simple for your users don't create new usage patterns, and adhere to common ones
- Common (all?) usage patterns should be easily available

••••• ?	9:41 AM	100% 💼
Settings	Wi-Fi	
Wi-Fi		\bigcirc
Location accura Wi-Fi is turned	acy is improved on.	when



- Be purposefully simple
- Skeuomorphs are almost always bad
- Be consistent (easier when simple)
- Make it simple for your users don't create new usage patterns, and adhere to common ones
- Common (all?) usage patterns should be easily available
 - Rest should be revealed as needed

••••• ?	9:41 AM	100% 🗪
Settings	Wi-Fi	
Wi-Fi		\bigcirc
Location accura	acy is improved	when
Wi-Fi is turned		



- Be purposefully simple
- Skeuomorphs are almost always bad
- Be consistent (easier when simple)
- Make it simple for your users don't create new usage patterns, and adhere to common ones
- Common (all?) usage patterns should be easily available
 - Rest should be revealed as needed
- Make self-documenting applications





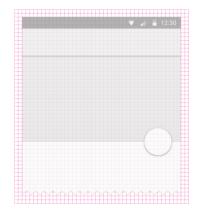
Spacing

Choose a baseline unit size (e.g. 8px)

	1	17	1		17	L_	L_	Г ⁻		1				17		1												1			
	1																														
						\square	\square																								
	t	t	t		F	\vdash	F		_					t	t					_	_	_			-		F				
-	t					\vdash	t		_		_					-				_	_	_			-						
-	t	-	-	-	-	\vdash	t		-		-	-		-	-	-	-			-	-	-	-		-		-	-			
-	+	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-
-	+	-	-	-	-	+	+	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-		-	-			-
-	+	-	-	-	-	-	+	-	-	-	-			-	-	-	-	-	-	-	-	-	-		-		-	-		-	-
-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
_	-	-	-	-	-	-	-	-	_	-	_	_	_	-	-	-	-	-	-	_	_	_	_	_	_	_	-	-	_	_	_
_	1	-	-	-	-	1	1	-	_	-	_			-	-	_	_			_	_	_	_		_		-	_			_
_				_	_										_	_	_										_	_			
	-																														
	t					\vdash	\vdash																								
	t	-				\vdash	F		-		-			-						-	-	-									
	t	-	-	-		-	\vdash							-	-	-											-	-			
-	+	-	-	-	-	\vdash	⊢	-	-	-	-			-	-	-	-	-		-	-	-	-		-		-	-			
-	+	+	+	-	-	+	+	-	-	-	-			+	+	-	-	-	-	-	-	-	-		-		-	-			-
-	+	-	-	-	-	+	+	-	-	-	-			-	-	-	-	-	-	-	-	-	-		-		-	-		-	-
-	+	-	-	-	-	-	-	-	-	-	-			-	-	-	-	-	-	_	-	-	-		-		-	-		-	_
_	+	-	-	-	-	-	-	-	_	-	_			-	-	-	-	-	_	_	_	_	_		_		-	-			_
	1	-	-	-	1	1	1	-	_					-	-	-	-			_	_	_					-	-			_
				_		⊢	⊢								_	_											_	_			

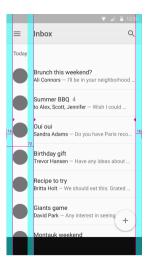


- Choose a baseline unit size (e.g. 8px)
- Align everything to that baseline size





- Choose a baseline unit size (e.g. 8px)
- Align everything to that baseline size
- Use a small set of spacing alternatives (e.g. 2, 3 and 6 units)



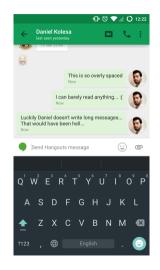


- Choose a baseline unit size (e.g. 8px)
- Align everything to that baseline size
- Use a small set of spacing alternatives (e.g. 2, 3 and 6 units)
- Make sure touch-targets are spaced enough





- Choose a baseline unit size (e.g. 8px)
- Align everything to that baseline size
- Use a small set of spacing alternatives (e.g. 2, 3 and 6 units)
- Make sure touch-targets are spaced enough
- Be generous, but don't overdo it (don't waste my screen estate)





Organization

Content should be at the front of the stage

		tranced at an h						
	a to hed on - Hapiltanon, Histor, Ap							
	Orenage income Mail Montana Ma In Ma Takent Chattan For States La	in Ensert-Darks Herr Jacob Heathe semage Michils Ensentie Exigh Josefs in Marter Mani Ende IV 1000.						
Tabled Shoeping The	seads of store Million of products	In the News						
Departments Sto	ma Features	- Tababanana const. homa						
Arand Bolesau La	Andara Established	expension on 14,000 hadote - Charles Parenteet to strend heat						
Roady Ma de	Databash June	- Distances of the Distances						
		Ball-						
Littendes Los Co	i throughout	Mateplace						
		Y. Daniel - Sup Schelaria, elsevia anticial famore						
Arts & Humanities	tixws & Media	and they recent and and						
Anatas Doluginging	Enklassmage, Econographics IX-							
Susiness & Economy	Recreation & Sports	· Y. Dans - braid on resident story in						
lift fames throwing life	Spots, Incoi Auton, Californi,	Encode and Except						
Computers & Internet	Reference	Allow IT Address to Deads						
Computers & Concest	Araba Dubinates Durations	7 Non-Technology to Faulty						
		- from (Kannard), vo Obbelana						
Education Infrastructure E.L.	Regional Creation Trajuna UL Dates	Root.						
College and Charlosopy, R.1.2	Country Segura ULBARS	Inside Values?						
Entertainment	Science	V.Menne - 102.0 deature. Universitation. The Owner, Roughale						
Collada Merris Basis, Muse-	Anatolia, Astronomy, Engineering							
Souwment	Social Science	Party Table - has a to your						
Instant Mater Lee, Tang	Antoniogo, Company, Language,							
		· Y. Photog - post your pice orders						
(in all)	Society & Culture	· Y. Dates - mblings, spacks,						
Robins Darans Drugs Educar	Tropis Sermontent, Edgen	diagons.						

Man Yalach Dada' Autor Canon - Dath- Seng - Dathnes - Dat - End State - Educingent



#1988 1 ++ p+ 1



Organization

- Content should be at the front of the stage
- Important functionality in key positions

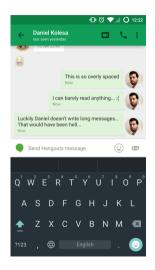




Designing an Application | Layout

Organization

- Content should be at the front of the stage
- Important functionality in key positions
- Make the hierarchy of information clear





Designing an Application \mid Layout

Organization

- Content should be at the front of the stage
- Important functionality in key positions
- Make the hierarchy of information clear
- Associate related elements





Designing an Application | Layout

Organization

- Content should be at the front of the stage
- Important functionality in key positions
- Make the hierarchy of information clear
- Associate related elements
- Help directing the user's focus

	•You Search Images	Maga Play YouTaba	Nows Genall Drive Calendar More-			
	Google			Q		
	Gmail -	· 0	More =			
	COMPOSE Inhox (3) Staved Important	Peak Disposal Senices - www.peakdisposal.com - Bin & Dumpster Rental Junk Removal Call 604 600 7325 for a quote				
		🗆 🚖 🕞 Gnail Team	Customize Gmail with colors and them	H - To spice up your intex with colors and then		
		🗌 🚖 💼 Genall Team 🛛 Get Graall on your mobile phone - Access Graal on your mobile phone		an Genail on your mobile phone The days of nee		
	Sert Mail	🗆 🚖 🗅 Gnall Team	Get started with Gmail - 4 things you nee	d ta know Genali is a little bit different. Learn the		
	Drafts More *					
	1		New Massage	_ * ×		
	New Hangout		Te	Co Bee		
	Find Nerda to chat with		Bubject			
	- A					
	0 77					
		0% full Unite 2 GB of your 18.1 GB	5001 <u>A</u> 8 +	¥ -		



Designing an Application | Visuals Icons and images

Use known icons on buttons





- Use known icons on buttons
- Don't use a known icon for something other than intended





- Use known icons on buttons
- Don't use a known icon for something other than intended
- Use rich graphics when appropriate (cover-art, mood graphics, etc.)





- Use known icons on buttons
- Don't use a known icon for something other than intended
- Use rich graphics when appropriate (cover-art, mood graphics, etc.)
- Don't overshadow content





- Use known icons on buttons
- Don't use a known icon for something other than intended
- Use rich graphics when appropriate (cover-art, mood graphics, etc.)
- Don't overshadow content
- Don't use ugly graphics





- Use known icons on buttons
- Don't use a known icon for something other than intended
- Use rich graphics when appropriate (cover-art, mood graphics, etc.)
- Don't overshadow content
- Don't use ugly graphics
- Have consistent sizing





Typography

► Use a readable font size

Text should be big and readable for everyone



Designing an Application $\ | \ {\rm Visuals}$

Typography

- Use a readable font size
- Space up your text

Alice's Adventures in Wonderland (commonly shortened to Alice in Wonderland) is an 1865 novel written by English author Charles Lutwidge Dodgson under the pseudonym Lewis Carroll. It tells of a girl named Alice falling through a rabbit hole into a fantasy world populated by peculiar, anthropomorphic creatures. The tale plays with logic, giving the story lasting popularity with adults as well as with children.

Alice's Adventures in Wonderland (commonly shortened to Alice in Wonderland) is an 1865 novel written by English author Charles Lutwidge Dodgson under the pseudonym Lewis Carroll. It tells of a girl named Alice falling through a rabbit hole into a fantasy world populated by peculiar, anthropomorphic creatures. The tale plays with logic, giving the story lasting popularity with adults as well as with children.



Typography

- Use a readable font size
- Space up your text
- Use text attributes (e.g. bold and size) to make text more or less prominent

Alice's Adventures in **Wonderland** (commonly shortened to Alice in Wonderland) is an 1865 novel written by English author *Charles Lutwidge Dodgson* under the pseudonym Lewis Carroll. It tells of a girl named Alice falling through a rabbit hole into a fantasy world populated by peculiar, anthropomorphic creatures. The tale plays with logic, giving the story lasting popularity with adults as well as with children.



Typography

- Use a readable font size
- Space up your text
- Use text attributes (e.g. bold and size) to make text more or less prominent
- Use a small set of fonts (probably one)

Your Game

Play OPTIONS Help SHARE About



Overlaying text on images

Just put it on (bad)





- Just put it on (bad)
- Black/colour/white-wash the whole image to make text readable





- Just put it on (bad)
- Black/colour/white-wash the whole image to make text readable
- Add translucent background to the text





- Just put it on (bad)
- Black/colour/white-wash the whole image to make text readable
- Add translucent background to the text
- Add a translucent gradient (i.e. partial black/white-wash) so your text area is handled





- Just put it on (bad)
- Black/colour/white-wash the whole image to make text readable
- Add translucent background to the text
- Add a translucent gradient (i.e. partial black/white-wash) so your text area is handled
- Use a big font with a shadow and on outline



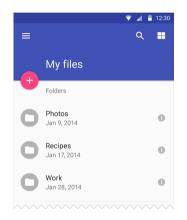


▶ Option 1 (easier): keep the interface b&w and use colour to direct focus

	· · O Hore ·			
COMPOSE	Peak Disposal Genéces - www.peakdisposal.com - Bin & Dampster Rental Junk Removal Call 604 699 7325 for a gaste			
Induces (3) Starved	🗆 🚖 🗅 Gnail Team	Customize Gmail with colors and themes - To spice up your libercivity	colore	
Important	🗆 🚖 🗅 Gnail Team	Get Gmail on your mobile phone - Access Gmail on your mobile phone The da		
Dert Mail	🗆 🚖 🗁 Gnail Team	Get started with Gmail - 4 things you need to know Omail is a little bit di	feret	
Drafts More +				
1		New Message	-	
New Hangout		Te	0	
Find friends to chat with		Subject		



- Option 1 (easier): keep the interface b&w and use colour to direct focus
- Option 2: Choose a palette of 2 different hues and use different shades





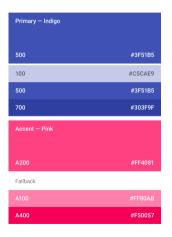
- Option 1 (easier): keep the interface b&w and use colour to direct focus
- Option 2: Choose a palette of 2 different hues and use different shades
- I almost always tint my greys (and not use black)

Some text! Some text!



Colour

- Option 1 (easier): keep the interface b&w and use colour to direct focus
- Option 2: Choose a palette of 2 different hues and use different shades
- I almost always tint my greys (and not use black)
- Find a good palette online





- Option 1 (easier): keep the interface b&w and use colour to direct focus
- Option 2: Choose a palette of 2 different hues and use different shades
- I almost always tint my greys (and not use black)
- Find a good palette online
- Use HSV rather RGB when choosing colours





Mimic what works

Compare to other applications you/users like better using what we've covered



- Compare to other applications you/users like better using what we've covered
- Mimic what's good there (e.g. do you need more spacing?)



- Compare to other applications you/users like better using what we've covered
- Mimic what's good there (e.g. do you need more spacing?)
- It's usually easier to mimic than to design from scratch



- Compare to other applications you/users like better using what we've covered
- Mimic what's good there (e.g. do you need more spacing?)
- It's usually easier to mimic than to design from scratch
- Don't mimic the bad things (i.e. use them as excuse)



- Compare to other applications you/users like better using what we've covered
- Mimic what's good there (e.g. do you need more spacing?)
- It's usually easier to mimic than to design from scratch
- Don't mimic the bad things (i.e. use them as excuse)
- ► Don't copy, learn...



User experience tips

Consistent behaviour (with the platform and within the application)



User experience tips

- Consistent behaviour (with the platform and within the application)
- Start instantly and lazy load in the background



User experience tips

- Consistent behaviour (with the platform and within the application)
- Start instantly and lazy load in the background
- Everything should take a small amount of clicks



User experience tips

- Consistent behaviour (with the platform and within the application)
- Start instantly and lazy load in the background
- Everything should take a small amount of clicks
- Discoverable UI (easy to figure out how to do things)



More user experience tips

Make it harder to make mistakes

Are you ABSOLUTELY sure?	(X)			
Unexpected bad things will happen if you don't read this!				
This action CANNOT be undone. This will delete the Jhosman/darkroom repealiory, wiki, issues, and comments permanently. Please type in the name of the repository to confirm.				
I understand the consequences, delete this repository				



More user experience tips

- Make it harder to make mistakes
- Avoid interruptions





More user experience tips

- Make it harder to make mistakes
- Avoid interruptions
- Sort long lists in a predictable, sensible order



More user experience tips

- Make it harder to make mistakes
- Avoid interruptions
- Sort long lists in a predictable, sensible order
- If your users do something and expect something to happen, it probably should happen



Open-source GUI toolkits

> Opted for a consistent theme-able system, not individually styled apps



Open-source GUI toolkits

- > Opted for a consistent theme-able system, not individually styled apps
- Usually look very similar (for better or worse)



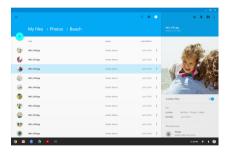
Open-source GUI toolkits

- Opted for a consistent theme-able system, not individually styled apps
- Usually look very similar (for better or worse)
- Mostly similar in their widget offering and can be styled to look similar



Material design (Google)

Highly talked about cross device design guidelines





- Highly talked about cross device design guidelines
- A fairly good Android adoption rate

			۹ 🔳 🕚	4 F F
•	Title	Dener	Last Modified	
ĊD)	INS_F0100	Sandra Adama	24.0,000	Carlos a
6	100, #01app	Sandra Adama	Art 5, 2014	the second
4	INS.403.09	Sand's Adams	Art 6,000 - 1	-32-63
6	168,4133.pp	Sandra Adama	An 1, 1914	
10	INS.4134,00	Sandra Adama	Art 6, 1994 - 1	
٩	WE,410.09	Eard's Mars.	A# 8,1014	Available (Pilling
1	INN_4131.000	Sandra Adama	A# 5.1094	10
S	INS, COLUMN	Tandra Islams	A# 3, 1974	Leadion My files × Proce × Seach Modified Jun 5, 351.4
99	INS, 4135.pp	Sandra Adama	A# 5,201	Who has access
۲	WE.4131309	Sandra Adama	Jan 8, 2014	Proze people land car access



- Highly talked about cross device design guidelines
- A fairly good Android adoption rate
- I personally don't like animations that slow users down

			۹ 🔳 🕚	a 11
•	100	Deter	Last Modified	
5	INT. (10:00	Tanit's Adams	Art 6, 1994	Contra and
6	100, KT1 (rg	Santra Adama	Art. 201	
s.	INN.4111.00	Sand's Adams	Art 6,000 - 1	- 3 - 63
\$	100,103.pg	Sanita Adama	Art (101	
10	INS. #134.00	Sandra Adama	Art. 1994 1	
۲	100,4131,019	Sandra Islama.	An 1, 221	Available (1970a
٢	INN, #131.jpg	Sandra kdame	Art 5, 2014	belo
Q	INIL_FOT349	Sandra Adama	A83,000	Leadion My files + Proce + deach Modified Jun 5, 2014
99	100,410,210	Santra Adama	A# 5,201	Who has arrent
۲	INTE, 4131929	Sandra Adama	Art 5, 2024	Proze people land on score



- Highly talked about cross device design guidelines
- A fairly good Android adoption rate
- I personally don't like animations that slow users down
- Concepts are good, it's implementations that are not always good

			۹ 🖬 🕚	9. E B
<u>.</u>	Tite	Dwiter	Last Modified	
3	INT. (10100	Bandra Adama	244.6, 2024	Carlos and
6	1646, 4131 (are	Sandra Adama	Jun 5, 2014	
s.	WE.413.09	Sandra Adama	Au 6, 1994	1200
6	1681, 4133 (prg	Bandra Adama	Are 8, 2014	
10	INNL4134309	Sandra Adame	Art 6, 2014	
1	INTL_£131.000	Bandra Islama	Art 8, 2014	Analida D'Ana
ð	INNL4135200	Sandra Adame	Art 5, 2014	bd y
0	INS. (111)49	Bandra Indama	Art 8, 2014	Leadion My files = Photos = deach Modified Jun 5, 2014
e9	INS. #13620	Sandra Adama	Jun 5, 2014	Who has access
۲	INTE, 4131 (p.g.	Sandra Adama	Art 5, 2274	(a) Private people land can access



- Highly talked about cross device design guidelines
- A fairly good Android adoption rate
- I personally don't like animations that slow users down
- Concepts are good, it's implementations that are not always good
- It doesn't feel like they care about low-end and power consumption

			۵ 💷 🍈	4 F B
•	TH	Danier	Last Modified	~
ĊD)	INS_F0100	Bandra Adama	24.5,000	(California
6	1665, 4111 (pq	Sandra Adama	Jac 8, 2004 1	1
4	INS.403.pg	Sandra Adama	An X 1994	1200
6	INS, 4133 (rg	Sandra Adama	Au 1, 1914	
10	INS.4134.00	Sandra Adama	Art. 1994	
٩	INE_£01309	Bandra Marra	An 1, 1914	Available (1970)
1	INNE_4131.000	Sandra Adama	Art 5, 2014	lates
S	INN, F131394	Bandra Adama	A83,201	Leadion My files × Protoc × Beach Modified Jun 5, 3014
99	INS_4135.pp	Sandra Adama	A# 5,2014	Who has access
۲	INTE. 4121 (Jug	Sand's Adams	A& 5, 2274	Proze people land car access



iOS guidelines

Old style: horrible skeuomorphism



- Old style: horrible skeuomorphism
- ▶ New style: very simple and clean, sometimes confusing



- Old style: horrible skeuomorphism
- ▶ New style: very simple and clean, sometimes confusing
- Flat and easy to theme



- Old style: horrible skeuomorphism
- ▶ New style: very simple and clean, sometimes confusing
- Flat and easy to theme
- Good general guidelines



- Old style: horrible skeuomorphism
- ▶ New style: very simple and clean, sometimes confusing
- Flat and easy to theme
- Good general guidelines
- Usually not very discoverable



EFL

Proportional layout (hard to create non-scalable layouts)





EFL

- Proportional layout (hard to create non-scalable layouts)
- We make it harder to not use the system theme





EFL

- Proportional layout (hard to create non-scalable layouts)
- We make it harder to not use the system theme
- We are mostly flat, use 3d when helps usability (similar to Material)





Toolkit Specific | Usability

Know your toolkit

Trying to pixel match a design across toolkits is stupid



Toolkit Specific | Usability

Know your toolkit

- Trying to pixel match a design across toolkits is stupid
- Know what takes a performance hit on your toolkit



Toolkit Specific | Usability

Know your toolkit

- Trying to pixel match a design across toolkits is stupid
- Know what takes a performance hit on your toolkit
- Check out the toolkit's common patterns, those are usually best for performance and users



Easy Tips (TL;DR) | Usability Easy takeaways

> It's like API design, it should be simple, self-documenting, consistent and have a familiar feeling



Easy Tips (TL;DR) | Usability Easy takeaways

- It's like API design, it should be simple, self-documenting, consistent and have a familiar feeling
- Start with black and white, don't colour unless you need it



- It's like API design, it should be simple, self-documenting, consistent and have a familiar feeling
- Start with black and white, don't colour unless you need it
- Saturate your greys and don't use black



- It's like API design, it should be simple, self-documenting, consistent and have a familiar feeling
- Start with black and white, don't colour unless you need it
- Saturate your greys and don't use black
- Add spacing and make your text bigger



- It's like API design, it should be simple, self-documenting, consistent and have a familiar feeling
- Start with black and white, don't colour unless you need it
- Saturate your greys and don't use black
- Add spacing and make your text bigger
- Use common patterns (and take inspiration from the best)



- It's like API design, it should be simple, self-documenting, consistent and have a familiar feeling
- Start with black and white, don't colour unless you need it
- Saturate your greys and don't use black
- Add spacing and make your text bigger
- Use common patterns (and take inspiration from the best)
- Pay the design some thought (from the start)



Example of a Poor Design | Usability

Less obvious example

▶ The hell that is going to the cinema in London...



Questions?

Tom Hacohen

tom.hacohen@samsung.com
http://stosb.com
@TomHacohen



Resources Attributions | Usability

- Page 11, flight-deck.jpg
- Page 15, twitter-sketch.jpg
- Page 23, purposefully-simple.png
- Page ??, skeuomorph.jpg
- Page ??, self-documenting.png
- Page ??, layout-baseline-align.png
- Page ??, layout-spacing-alternatives.png
- Page 55, direct-attention.png

Resources Attributions | Usability

- Page ??, imagery-mood.png
- Page ??, bad-blurry.png
- Page ??, multiple-fonts.png
- Page 50, text-overlay-bad.jpg
- Page ??, two-colours.png
- Page ??, palette.png
- Page 69, repo-delete-confirmation.png
- Page ??, interrupt-programmer.jpg
- Page 76, material.png