Game Development

Mike Burton
Perfect Minute

.BOOT CAMP

About This Talk

Mike Burton
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This talk was developed for and presented at Newfoundland Gaming Expo 2015.

The talk was developed for an audience aged 19 and younger who were interested in learning more about the game industry and the process of developing videogames.

Who IS Mike Burton?

- Professional: 15 years in software development
- Amateur: Worked on mods for Deus Ex
- Old: graduated in 2000 with a degree from MUN
- Lazy: Wrote lots of short game specs before tackling one seriously
- Nuts: Founded a game company with negative money in the bank!

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- Local game company
- Focused: Short games, VR
- Founded 2015
- 3 guys – Programmer, Player, Artist
- Many (, many, many) hats each!
- Built 2 prototypes in 6 months
- Devblog – http://perfectminute.net/devblog

Overview

1. Production
2. Design
3. Tools
4. Content
5. Programming

STORYBOARDS

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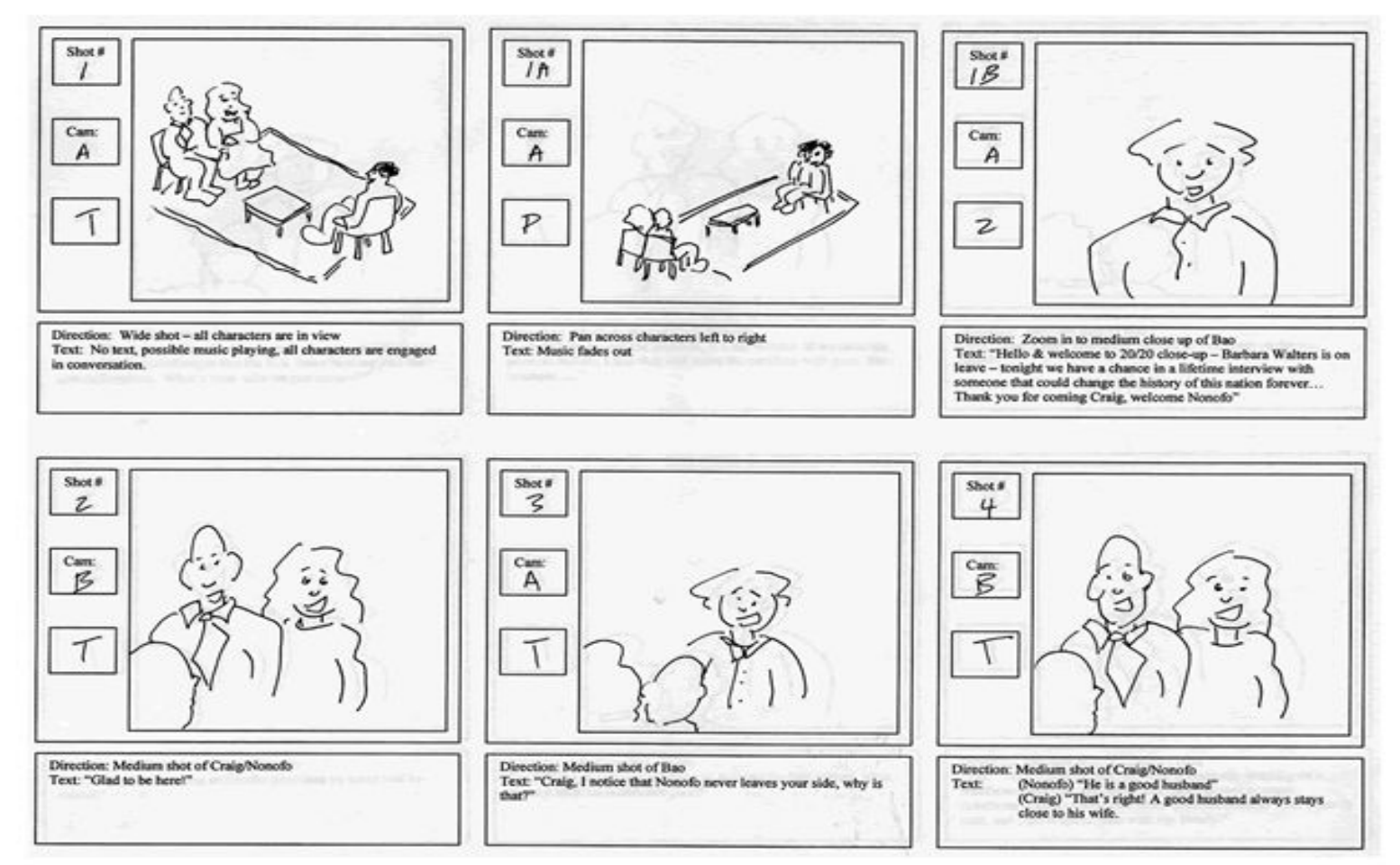
- Regular storyboard for comic/film/tv/whatever:



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  or

Storyboard: Games

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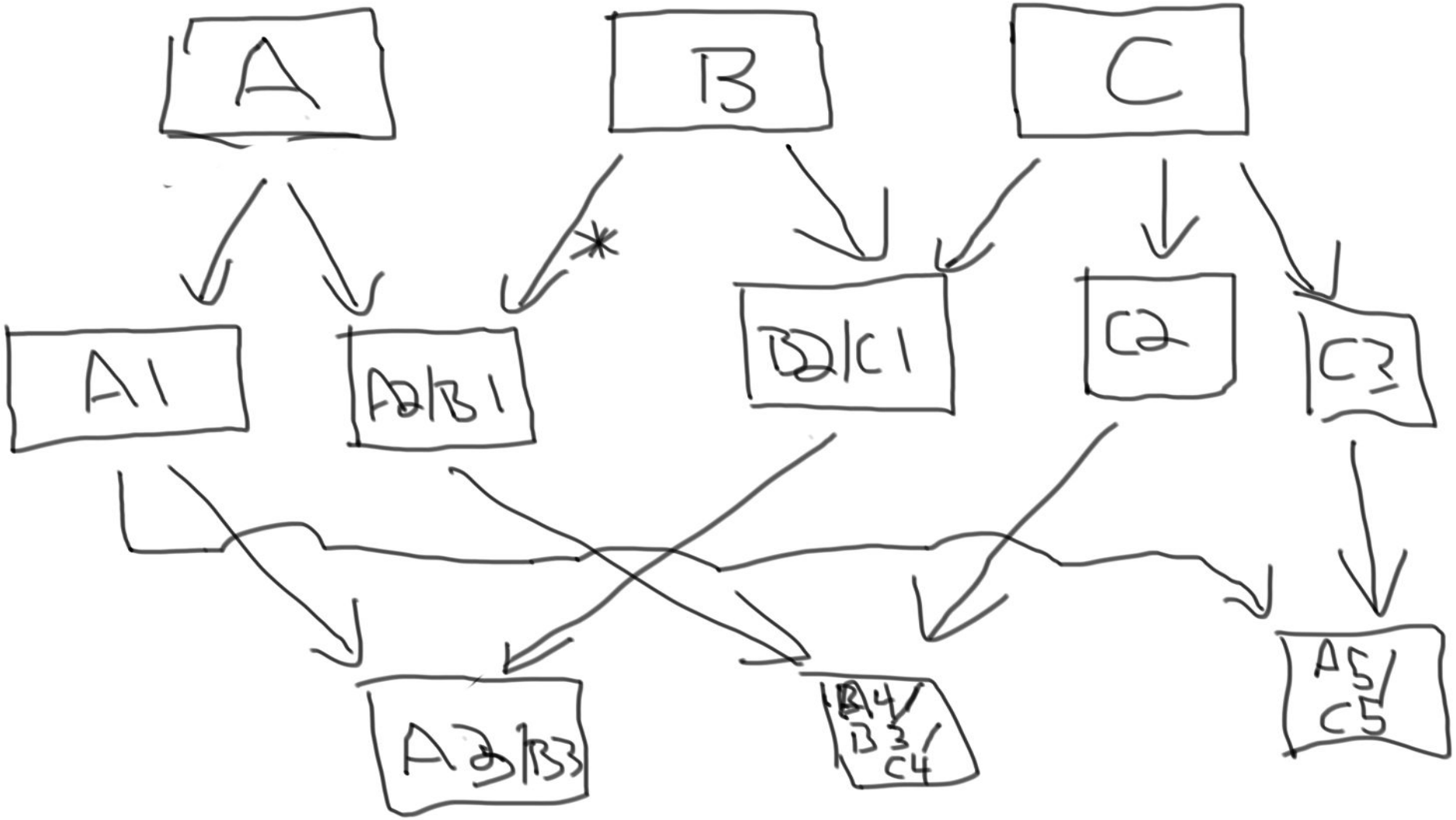

Storyboard

- Key tool at all stages!
- Plans your game
- Elaborates your moments
- Syncs your content “beats”
- Directs your story
- Gives the programmer night terrors!

PRODUCTION

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- Preproduction
- FINDING your game

- Getting investment
- FUNDING your game

- Marketing
- FLOGGING your game

Talking to Players

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- Key Question:
  - Who will PLAY your game?
- DON'T
  - Ask for a description of the perfect game
  - Describe your game's specific mechanics
  - Solicit ideas
- DO
  - Ask what games they do and don't like
  - Ask about what they enjoy in those games
  - Talk about your game in terms of other games
  - TAKE NOTES!!!!!

Talking to investors

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- Key Question:
- Who's gonna PAY for my game?

- Money gets more and more expensive:
  - Family and Friends – good will
  - Players – guarantees, extra work
  - Banks – interest, liability
  - Investors – part of your business and/or

Talking to the media

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- Key Question:
- Who's gonna SAY stuff about my game?
- (and what will they say?)

- Start early!
- Talk to anyone, big or small
- Don't forget the game stores themselves
- Work hard on your press releaess
- Be nice to people!

Storyboarding

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- Storyboard drives the implementation plan
- WHO do I need?
- WHAT do they need to produce?
- WHEN do I need them?
- WHERE am I getting the money for all that work?

DESIGN

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- PITCH
  - The short, short version
- DETAIL
  - The actual version
- TECHNICAL
  - The programmer's version

Approaches to design

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- Many approaches
- Feeling-first – auteur
- Play-first – innovator
- Market-first – populist
- Tech-first – demo
- Money-driven – commercial
- Monograph – unique one-off

- Not limited to just one!

Writing a pitch

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- This is the fun part!
- (But it's still a LOT of work!)

- Should stem from your design approach

- Should not be longer than about 500 words (1 page)!
- You should have a version that fits in a tweet.
- Pictures will help, but choose 2-3 at most (1 for the tweet!)

Example pitch

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- CONTENTION is a realtime tactics game for mobile platforms.
- Bad: Tells you nothing about the world of the game
- Bad: Limits your market to mobile platforms

Adding a world

- Easy – Setting
  - Contention's setting varies with its factions – hard to communicate in a pitch
- Normal – Story, Characters
  - Contention doesn't really have a story
  - Contention has lots of different factions, but no specific characters
- Nightmare – High Concept
  - Contention has a strong high concept – the critique of violence in games

Improved Pitch

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- CONTENTION is a realtime tactics game for mobile platforms

Improved Pitch

Mike Burton
Perfect Minute

- CONTENTION is a realtime tactics game

Improved Pitch

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- CONTENTION is a realtime tactics game that takes on violence in videogames
  - Bad: Doesn't tell us where to look!
  - Bad: Off-putting to some audience members

Examining the pitch

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- CONTENTION is a realtime tactics game that takes on violence in videogames

- Serious tone
- “Cringe” effect – sounds a little preachy
- Still not very evocative

Improved Pitch #2

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- CONTENTION is a hilarious mobile-first realtime tactical sendup of violence in videogames
  - Good: Tells us where to look without limiting where we go
  - Good: Communicates values
  - Good: Tells us about gameplay
  - Good: Serious message in an audience-friendly package
  - Good: Evocative – ha-ha-larious

Lessons from Pitching

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- If it's hard to communicate your design in an interesting way, look at your design
- Improving a design to be more “pitchable” can bring better focus to what makes the game special
- Don't be afraid to criticize!

Detailed Specification

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- Primary Goal:
  Make sure everyone always knows what to do!
- Customized for your specific team!
  - Artist heavy? Programmer heavy?

- Needs to contain as much as possible of the original vision for the game.
  - Content
  - Gameplay
  - Experience

Design:
Detailed Specification

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- Specifics

- Levels
- Content
- Programming

Design:
Level Specification

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- Description of level
- Goals
- Play concepts
  - Limitations
  - Moving pieces

- Idealized “flow”
- Timing
- Emotions

- Special art and programming required
- Triggers
- Set pieces

Design:
Content Specification

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- "Concept" assets
  - Style bibles – make sure artists and writers know what to imitate
  - Design adherence – make sure the content fits the game
  - Voice – give characters and setting specificity
- Core assets
  - Model(s) & textures
  - Sound effects
  - Soundtrack
  - Dialogue trees
  - USER INTERFACE!!!!
- Level-specific assets

Design: Technical Specification

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- Libraries
- Engine
- Third party components
- In-house Tools
- Reusable components

- Guides
- Code style
- Performance
- Interoperability “contracts”

TOOLS

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- Engines (Game Creation Tools)
- Art
- Sound
- Programming

Tools: Engines

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- Commercial:
- Unity
- Unreal
- Game Maker: Studio
- RPG Maker

- Open Source:
- Blender Game
- Crystal Space
- Torque

- Wikipedia:

V • T • E	Game engines (list)	[hide]
Source port · First-person shooter engine (list) · Tile engine · Game engine recreation (list) · **Game creation system**		
Free software / open source	**2D**	Adventure Game Studio · Beats of Rage · Box2D · Chipmunk · Cocos2d · Digital Novel Markup Language · Flixel · Exult · Game-Maker · Gosu · Jogre · KiriKiri · Moai SDK · ORX · Pygame · Ren'Py · StepMania · Stratagus · Thousand Parsec · VASSAL · Xconq
	2.5D	Aleph One · Build · Flexible Isometric Free · Id Tech 1 · Wolfenstein 3D
	3D	Away3D · Axiom · Blender Game · Cafe · Crystal Space · Cube · Cube 2 · Delta3D · Dim3 · Genesis3D · GLScene · Horde3D · HPL 1 · Irrlicht · Id Tech 2 · id Tech 3 (Ioquake3) · id Tech 4 · JMonkey · Luxinia · OGRE · Ogre4j · Open Wonderland · Panda3D · Papervision3D · Platinum Arts Sandbox Free 3D Game Maker · PlayCanvas · PLIB · Python-Ogre · Quake · Nebula Device · RealmForge · Retribution · Torque 3D
	Mix	Allegro · Construct Classic · Godot · Lightweight Java Game Library · Spring · Visualization Library
Proprietary	**2D**	Clickteam Fusion · Coldstone · Construct 2 · Corona · CRX · Fighter Maker · Filmation · GameMaker · GameMaker: Studio · Garry Kitchen's GameMaker · Generic Tile · Gold Box · MADE · Mscape · M.U.G.E.N · NScripter · RPG Maker · Shoot the Bullet · Sim RPG Maker · Sound Novel Tsukūru · Southpaw · Stencyl · Vicious · Virtual Theatre · V-Play · Z-machine · Zillions of Games · ZZT
	2.5D	Genie · INSANE · Infinity · Jedi · Pie in the Sky · Super Scaler · UbiArt Framework
	3D	4A · Advance Guard Game · Anvil/Scimitar · Arsys · Beelzebub · Bork3D · BRender · C4 · Chrome · Creation · CryEngine · Crystal Tools · Dagor · Diesel · Digital Molecular Matter · Disrupt · Dunia · EAGL · EGO · Electron · Elflight · Enforce · Enigma · Essence · Flare3D · Fox · Freescape · Frostbite · Geo-Mod · GoldSrc · HydroEngine · HPL 2 · id Tech 5 · id Tech 6 · Ignite · Iron · IW · Jade · Kinetica · LS3D · Luminous Studio · LyN · Marmalade · Mizuchi · MT Framework · NanoFX GE · Odyssey · Orochi · Outerra · Panta Rhei · Phoenix Engine (Relic) · Phoenix Engine (Wolfire) · PhyreEngine · Q · Real Virtuality · REDengine · Refractor · RenderWare · Revolution3D · Riot · RAGE · SAGE · Serious · Shark 3D · Silent Storm · Sith · Source · SunBurn XNA · Titan · TOSHI · Truevision3D · Unigine · Unity · Unreal · Vengeance · Visual3D · Voxel Space · XnGine · X-Ray · Yebis · YETI · Zero
	Mix	CPAGE · Dark · Gamebryo · Hybrid Graphics · Kaneva Game Platform · Metismo
Proprietary Game middleware (list)	AiLive · Euphoria · Gameware · GameWorks · Havok · iMUSE · Kynapse · Quazal · SpeedTree · Xaitment	

Elflight Engine

Tools:
Choosing an Engine

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- How much can I spend?
- Who's on my team?
- What do I need my engine to take care of for me?
- What features are on the roadmap?

Tools Example: Engine – AR game

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Unity

- Free for development
- Programmer friendly
- Previous experience
- Good on mobile
- Augmented Reality?
- Can access camera

Unreal

- Free for development
- Programmer friendly
- Previous experience
- Very good on mobile
- Augmented Reality?
- Cannot natively access camera

UNITY WINS!

Tools: Art

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- 3D
  - Maya
  - 3DS Max
  - Blender
- Drawing, Animation
  - Adobe Illustrator
  - Inkscape
  - Pencil
- Textures
  - Adobe Photoshop
  - GIMP

- http://alternativeto.net/

Tools: Sound

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- Sound tools

- Garageband
- Avid Pro
- Reason
- LMMS
- FL Studio
- Reaper
- SoundForge
- ACID Pro
- Lots more

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Tools: Programming

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Languages	Development	Source Control
C++	Visual Studio	MS Team
C#	IntelliJ	Git
Java	Eclipse	Subversion

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Tools:
Technical tools

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1) Who's on my team?

2) What do they prefer to use?

3) Can those tools do what we need?

CONTENT

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- Art
- Sound
- Writing

Content:
Art

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- Concept Art
- Drawings and paintings, sculpture
- Unlimited freedom
- Not normally used in game

- User interface
- Follow strict guidelines
- Programmer-ey

- Characters
- Player and non player characters, vehicles
- Items/decorations carried by characters
- Typically concepted first

Art:
Concepts - Vision

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- Concepts establish ***vision***

Art:
Concepts - Guidelines

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- OR concepts establish ***guidelines***
- http

23007

Art:
User Interface

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Art:
User Interface

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- First thing players see
- Set their expectations!
- Should look really good

- Tells them what to do
- Fewer options is (usually) better!
- Has a “flow” – most common menu option is on top, for example

- Needs to communicate everything they need to know
- Again, less is better in most cases!

Art:
Characters

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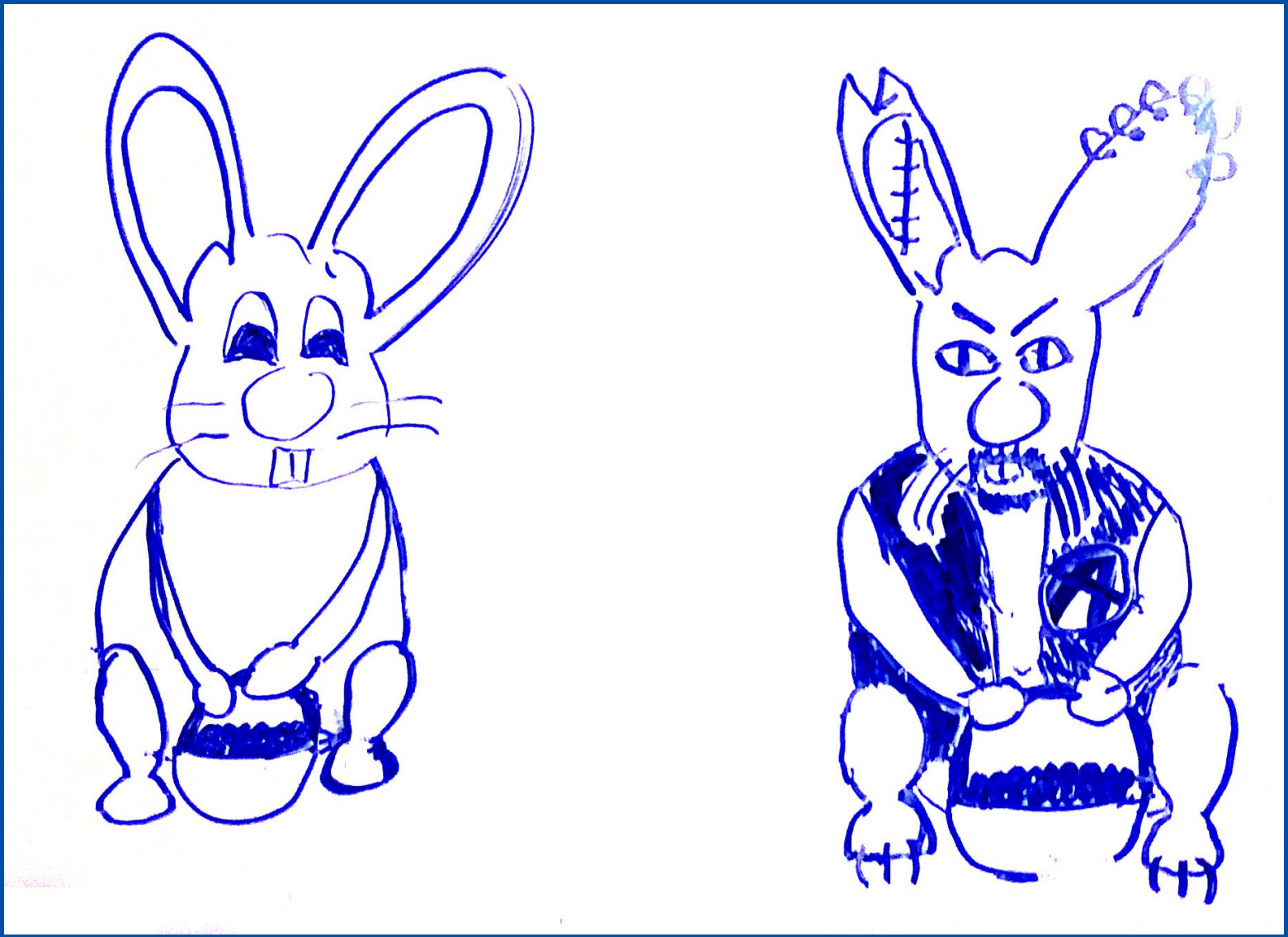

Art: Characters

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- Player's means of entering the game
- Someone they want to inhabit!
- Choice is a good thing!

- Mode of interaction
- Needs to be recognizable
- Obvious cues
- Gun: shoot
- Head turns: Click on that thing!

- Part of your user interface
- Characters should change based on their condition!

Characters:
Basic figure design

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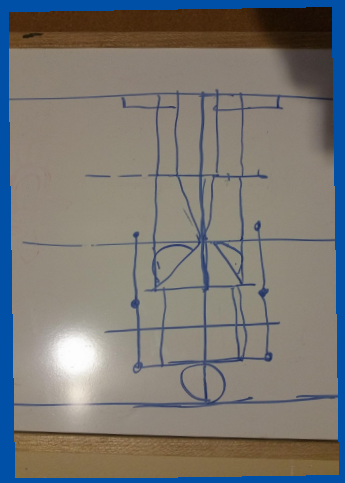

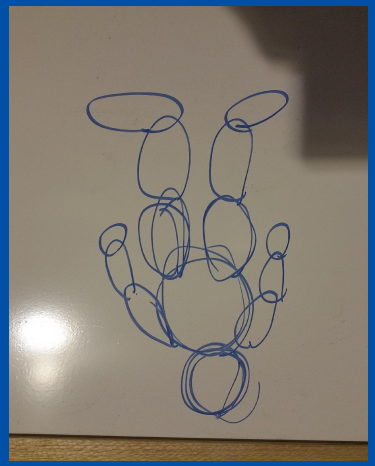

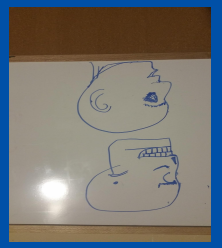

Figure design:
Coil figures

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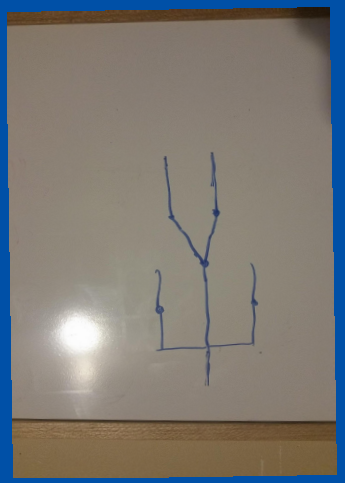

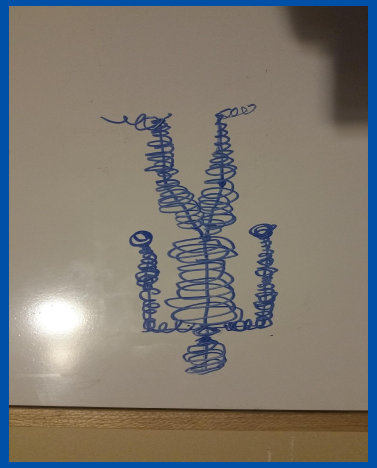

Figure design: Movement

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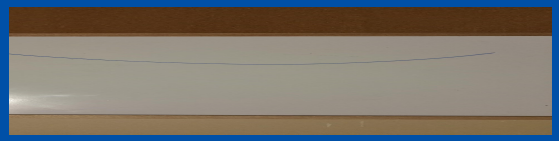

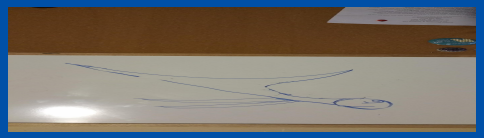

Art: Sets

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Art: Sets

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- Communicate your world
- Urban vs countryside
- Dark vs bright

- Reasons for interacting
- Again, needs to be recognizable
- Obvious cues
- Distinct colour differences between background and set pieces

- Source of amazement
- Fallout 3, Skyrim, Myst

Sound

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- Sound effects
- Static music
- Dynamic music

Sound

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Sound: Effects

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- Short
- Use looping to achieve continuous sounds

- Situational
- Duck quack vs plane – intermittent vs continuous

- Easiest asset to purchase!
- Tons of libraries online

Sound:
Music composition

- Extended pieces
- Not like music in a band!
- **“Like a movie, a game develops themes throughout, and these need to be addressed[...]The traditional songwriting equivalent would be a concept album. You’re not worried about radio airplay, three-minute hit singles and the like. Your goal is to complement the on-screen action and convey an emotion.”**

https://www.socan.ca/creators/member-resources/music-business-articles/

Sound: Storyboarding

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- Outline music alongside the game itself
- Design has to accomodate music

- Forks in play become trigger points for changing music
- if music is tempo-driven, this may be more challenging!

Sound: Recording

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- Clean sound
- Mic with screen
- Isolated room

- Single instrument at a time
- Production-dependent

- “Studio” musicians

Sound: Mixing

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- Production studio software
- Multitracking
- Cleanup
- Levels

- Dynamic music
- Transition snippets
- Transition effects

Sound:
Dynamic music

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- Games change at the time of play
- Multiple possible “moods”
- For sound production, content should be divided by theme
- Blending strategies
- Jazz!
- Instrumental (ie Rock Band)
- track overlay
- snippets

Sound:
Buying music

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- Licensed originals
- Covers
- Remixes
- Commissioned originals

Writing

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- Emotes
- Dialogue
- Narration
- Background

Writing: Emotes

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- City of Heroes
- Personalized to the player

- On screen text vs audio cues
- Cheap, customizable, and low-impact

VERSUS

- Immersive
- Need to be REALLY careful with audio emotes!

Writing: Dialogue trees

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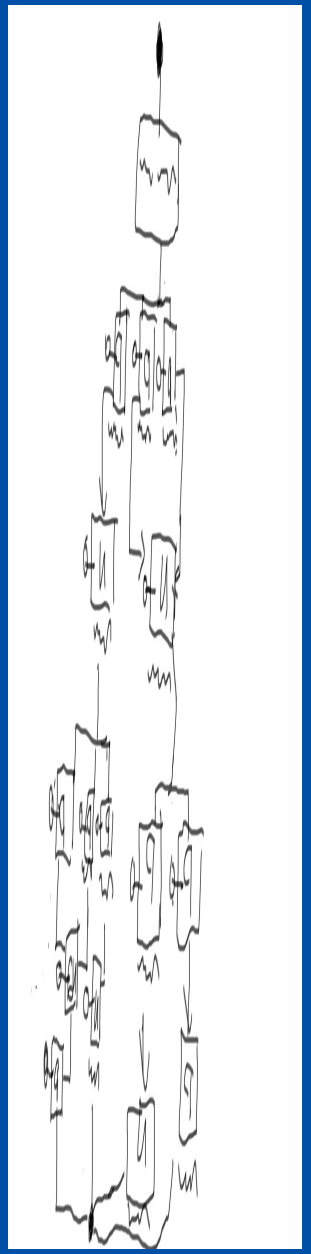

Writing:
Narration and Cutscenes

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- (Mostly) standard film techniques
- May need to account for game state
  - Mass Effect series
- Non-interactive elements – keep it light!
  - There are exceptions: Final Fantasy, MGS

Writing: Research

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- Write what you know
- You know what you research!

- Culture-specific ideas
- Foundation of good genre writing

- Many techniques beyond reading
- Discussions
- Community participation
- Travel
- “Inner” research – actors' training

Writing: History

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- Timelines
- Major events
- Significant people
- cross-cultural

- Cultural context
- “Winner” & “loser” perspectives

- Art!

Writing: Setting

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- Locations
- Cities, ruins, major geographic features (rivers, valleys, faults, mountains, etc)

- Landscapes
- Deserts, jungles, prairies
- BUT ALSO animals, plants, even physical and chemical phenomena (Interstellar!)

Writing: Editing!!!

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- Writing is editing
- PERSPECTIVE:
- Editing requires distance from a piece
- Time away
- Other people's opinions
- No piece of writing is ever finished, only abandoned

PROGRAMMING

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- Language(s)
- Engine
- Scripting
- Version Control

PROGRAMMING

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- Language(s)
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Programming: Pick your language(s)

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- Low level: Assembly, C, “Old school” C++
  - Extremely customizable, very difficult to debug
- High level: “New school” C++, C#, Java
  - Takes care of a lot of stuff for you
  - Still needs a fair bit of know-how for game dev
- Scripting: Lua, Ruby, C#, UnrealScript, BYOSL
  - Typically used inside an engine written in another language

Programming: Writing an engine

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- Reasons
  - Practice/learning
  - Missing features
  - New platforms
- Scope
  - Graphics, networking, sound, physics
- Features
  - Radiosity, voxels, stream packing

Programming: Gameplay

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- Modern engines use scripting languages
- Data structures
  - Dialogue trees
  - Finite State Machines
  - Save files/serialization
- Reusable “snippets”
  - Compartmentalized
  - Data-driven

Programming: Version control with Git

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- Developer A
  - Original copy (remote)
  - Local copy
  - Original version PLUS A's Change
- Developer B
  - Forked copy (remote)
  - Local copy
  - Original version PLUS B's change
- Process of combining changes is called MERGING

Questions

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- Thanks for coming!
- Mike Burton
- @oldmanhero
- Perfect Minute
- http://perfectminute.net/devblog
- @perfectminute