Creating Video Games

What's Going on in the Game Industry?

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DARWIN 3D *Software Creation*

History of Video games

◆ What did it take to get from here...
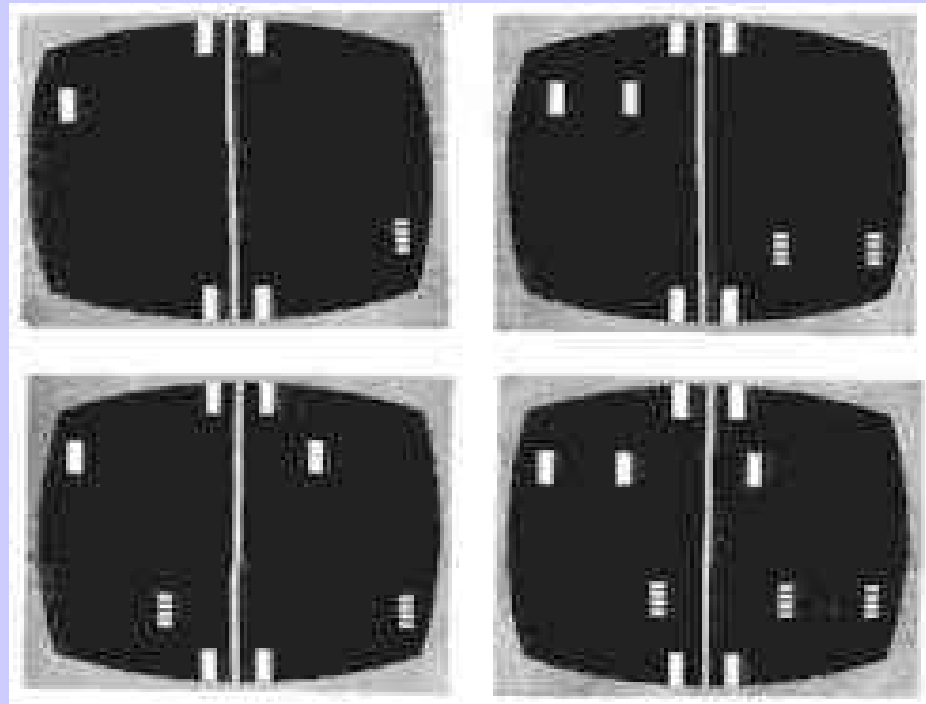
History of Video games
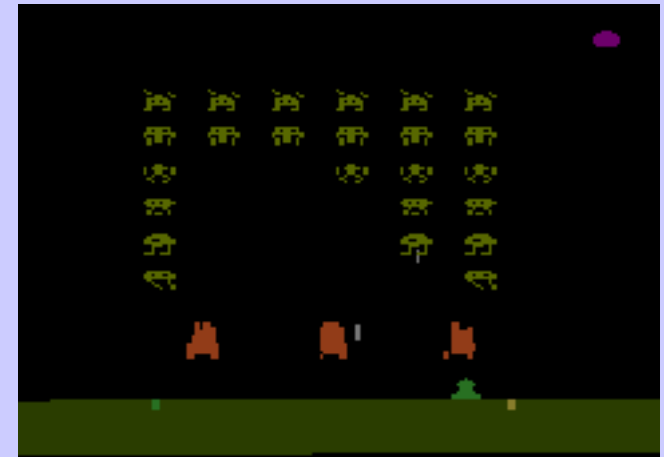
◆ To here...

Console Game Systems

- Atari 2600 (1977)
  - 8bit, 128 Bytes RAM
  - 320x200
  - Team Sizes 1-5 common
  - Sales 25 M
  - Budgets <$100K

- Sega Genesis (1989)
  - 16bit, 128K RAM/VRAM
  - 320x224
  - Team Sizes 5-15
  - Sales 150 M
  - Budgets <$250K

Console Game Systems

◆ Sony Playstation (1994)
  - ◆ 32bit, 2M RAM/1M VRAM
  - ◆ Graphics 320x240
  - ◆ CD Media 640MB
  - ◆ Team Sizes 5-50
  - ◆ Sales 100 M+
  - ◆ 8000+ titles, 950M+ sold
  - ◆ Budgets <$1M

Console Game Systems

- Sony Playstation 2(2000)
  - 128bit, 32M RAM, 4M VR
  - 640x440
  - DVD Media 4 GB
  - Team Sizes 15-100
  - Sales 75 M+
  - Budgets $5-12M+

Console Game Systems

◆ Sony Playstation 3 (2006?)
  ◆ 256M RAM, 256M VR
  ◆ 2 TFLOPS
  ◆ 1920x1080
  ◆ BlueRay Media 25-50 GB
  ◆ Team Sizes 50+?
  ◆ Budgets $8M+?
  ◆ Sales ???

What kind of Jobs are there?

◆ Programmers
- ◆ Most technical and traditional education required
- ◆ Salaries $55K-$300K average $62K
- ◆ Junior, Tools, Graphics, Engine, AI, Networkking, Lead

What kind of Jobs are there?

◆ Artists
- ◆ Includes most creators of game content
- ◆ Salaries $55K-$200K average $58K
- ◆ Modeling, Texture, 2D, 3D, Level Design, Animation, Art Director

What kind of Jobs are there?

- ◆ Design
  - ◆ Requires much experience and dedication
  - ◆ Salaries $50K-$200K average $57K
  - ◆ Game Designer, Level Designer, Writer, Lead

What kind of Jobs are there?

◆ Audio
  - ◆ More important every project
  - ◆ Salaries $45K-$130K average $57K
  - ◆ Sound designer, Composer, Audio programmer, Foley artist

What kind of Jobs are there?

◆ Production
  ◆ Makes sure the project finishes
  ◆ Salaries $60K-$160K average $66K
  ◆ Game tester, Test lead, Associate producer, Project Manager, Producer

What kind of Jobs are there?

- Other stuff needed to run a business
  - Network administrators
  - Legal
  - Office workers
  - Marketing
  - Finance

Game Production

- ◆ Modern console games
  - ◆ 2 years+ for development
- ◆ Steps for production
  - ◆ Pitch and Design (3-6 months)
  - ◆ Preproduction (3-6 months)
  - ◆ Production (1.5 – 2 years)
  - ◆ Post-production
    - ◆ Testing, balance, localization

Diversity

- Inclusive and welcoming industry
    - Need to meet and exceed the entry requirements
    - Meritocracy
    - Too few women represented (but are welcome)
    - Lack of local talent leads to searching the world
        - Current team has 20% work visa employees
        - Representing 15+ countries
- Production focus
    - Can lead to long hours and hard work
    - Maturing industry with growing pains

Education is the Key

◆ Math and Physics are our main tools
  ◆ Writing and Language skills are useful as well
◆ Geometry, Trigonometry, Linear Algebra
  ◆ Some calculus
◆ Newtonian Physics
  ◆ Personally have never needed Einstien but...
◆ Advanced High School level is ideal
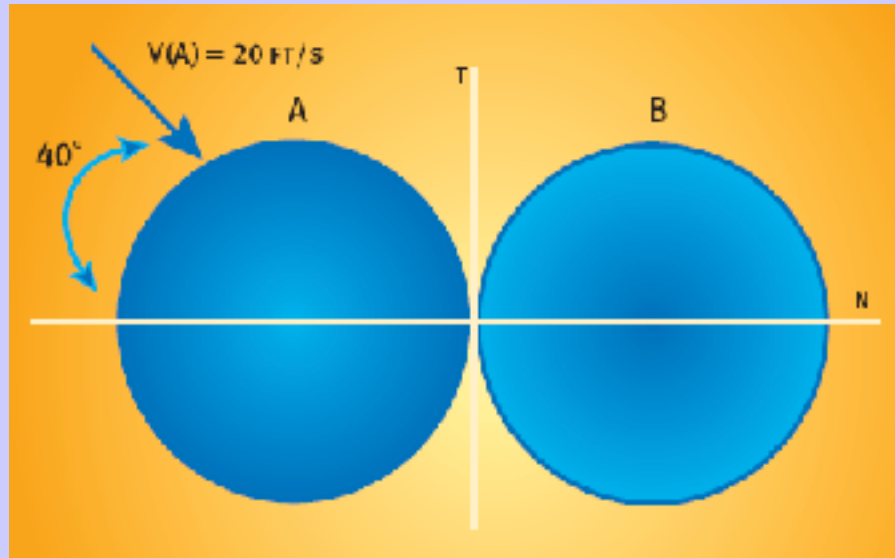 ◆ Many need to relearn forgotten skills

Math

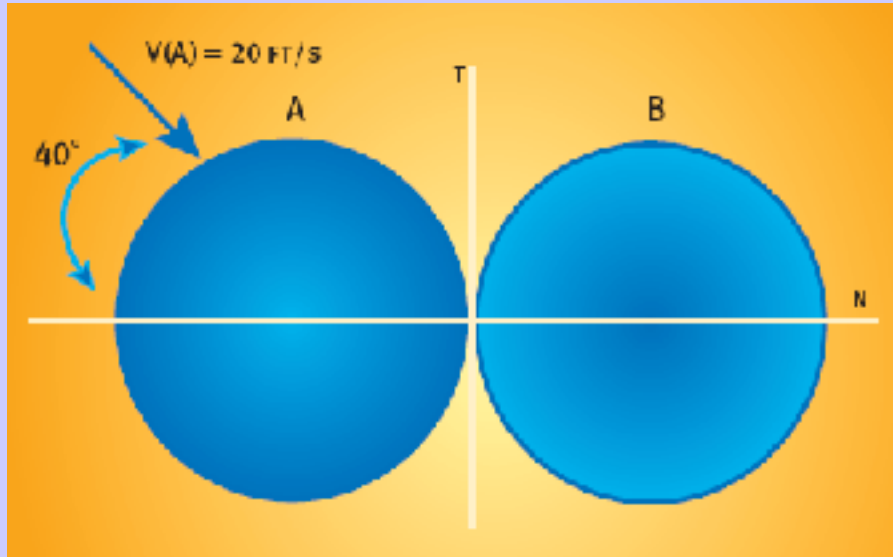◆ Vector, Matrices, Dot Products, Trig

$$h = h0 + v0t - (gt^2)/2$$

This is one of the most powerful tools in our belt. Anyone recognize it?

Math

A little game of pool

Math

VdotN = contact->normal.Dot(&ball->v);
Vn = contact->normal * VdotN;
Vt = ball->v - Vn;
Vn1 = Vn * contact->Kr;
ball->v = Vt - Vn1;
Vn1 = Vn * (1.0f - contact->Kr);
ball2->v += Vn1;

No Math for Me!

◆ What about artists and designers?
   ◆ Are math and science skills required
   ◆ A common language is needed to convey ideas

No Math for Me! I do the art.

◆ Give me that motion in 8 directions.
   ◆ What angles would those be at?
◆ I need a walking turn that goes 10 meters and ends at 130 degrees.
◆ Euler angles, IK effectors, keyframes, meters per second.

No Math for Me! I do the design.

◆ I am created a puzzle where the player needs to compete to jump the furthest.
  ◆ What controls are important for the player to use in this design?

No Math for Me! I do the design.

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   ◆ What controls are important for the player to use in this design?

No Math for Me! I do the design.

- ◆ I want waves of alien spaceships to attack the player.
- ◆ It needs to be a pattern the player can learn
  - ◆ It can't be random.
  - ◆ Must be repeatable
- ◆ Has to look chaotic and fun
- ◆ How would you design such a system?

No Math for Me! I do the design.

◆ Simple math functions combined reveal complexity.
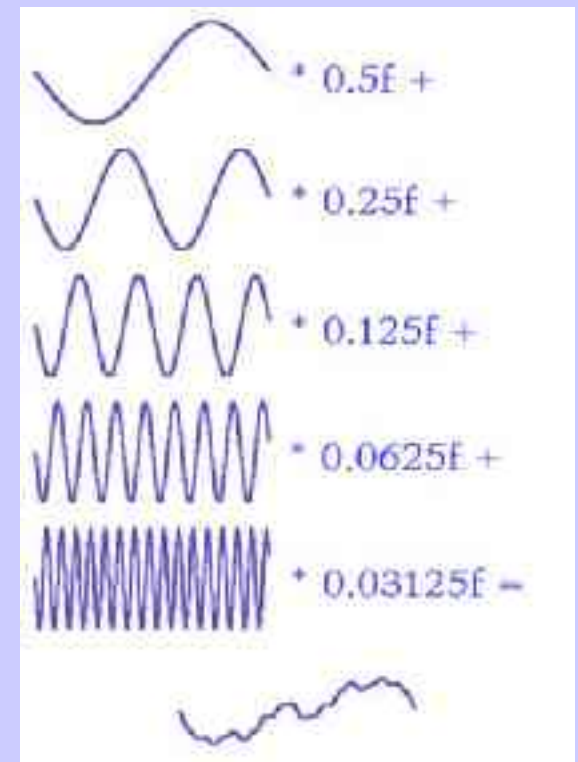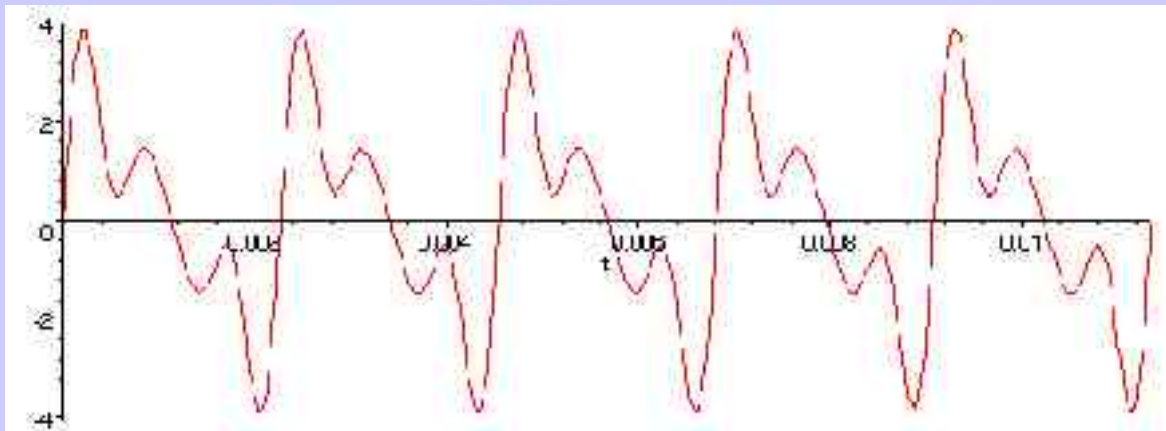
No Math for Me! I do the design.

◆ Modern adventure games have hundreds of weapons, items, spells, with various power and costs.

◆ How do you balance and adjust all those various values?

◆ Tuning power of enemies and weapons.

◆ Damage = strength * (1 + random(0.2))

Conclusion

- ◆ Great opportunities in the Game Industry for people just like you.
- ◆ It does require some work from you.
- ◆ The tools needed are right in front of you.
- ◆ You can tell your parents that your next game is actually research.

More Information

- ◆ www.darwin3d.com
- ◆ jeffl@darwin3d.com
- ◆ www.igda.org
  - ◆ International Game Developer's Association
  - ◆ Chapter meetings here in Los Angeles

No Math for Me! I do the audio.

- ◆ Sound foley is more complex than ever.
  - ◆ 3D positional audio requires velocity and position to determine sound.
  - ◆ Pitch of car engine might be a function of RPM, the gear the motor is in, and the size of engine.