

# Think It By Hand

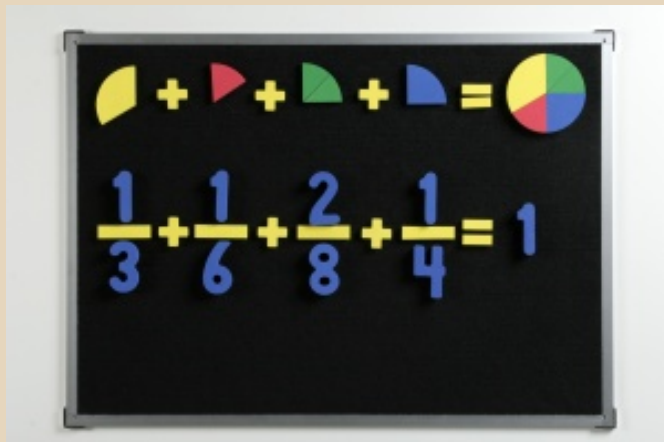
## Initial Presentation

INF 132, Group 3

Danny Lam, Katherine (Kathy)Nguyen, Jari-lee (Jay) Tolentino

# Introduction to "Think It By Hand"

- The Company
  - Provides learning materials for hands on math, science, language arts education K-12
  - Products & services are designed to involve students to learn at conceptual/procedural level
  - Goal is for students to gain a breadth of understanding to build further learning



# "Think It By Hand": The Application

- What is the application?
  - An Android based tablet application meant to teach math to children with disabilities
- Who will use it?
  - Children in grades Kindergarten - 8th
  - Children with learning and physical disabilities and autism
- What is our task?
  - Build a rough prototype and test it with a subgroup of users

Problem 1

Between 0 and 1 where would  $\frac{1}{2}$  go?

0 ————— 1

Try Again!

Practice Again?

1/2

1/3

2/3

1/4

3/4

1/5

4/5

1/6

5/6

1/7

6/7

1/8

7/8

1/9

8/9

1/10

9/10

1/11

10/11

1/12

11/12

1/13

12/13

1/14

13/14

1/15

14/15

1/16

15/16

1/17

16/17

1/18

17/18

1/19

18/19

1/20

19/20

1/21

20/21

1/22

21/22

1/23

22/23

1/24

23/24

1/25

24/25

1/26

25/26

1/27

26/27

1/28

27/28

1/29

28/29

1/30

29/30

1/31

30/31

1/32

31/32

1/33

32/33

1/34

33/34

1/35

34/35

1/36

35/36

1/37

36/37

1/38

37/38

1/39

38/39

1/40

39/40

1/41

40/41

1/42

41/42

1/43

42/43

1/44

43/44

1/45

44/45

1/46

45/46

1/47

46/47

1/48

47/48

1/49

48/49

1/50

49/50

1/51

50/51

1/52

51/52

1/53

52/53

1/54

53/54

1/55

54/55

1/56

55/56

1/57

56/57

1/58

57/58

1/59

58/59

1/60

59/60

1/61

60/61

1/62

61/62

1/63

62/63

1/64

63/64

1/65

64/65

1/66

65/66

1/67

66/67

1/68

67/68

1/69

68/69

1/70

69/70

1/71

70/71

1/72

71/72

1/73

72/73

1/74

73/74

1/75

74/75

1/76

75/76

1/77

76/77

1/78

77/78

1/79

78/79

1/80

79/80

1/81

80/81

1/82

81/82

1/83

82/83

1/84

83/84

1/85

84/85

1/86

85/86

1/87

86/87

1/88

87/88

1/89

88/89

1/90

89/90

1/91

90/91

1/92

91/92

1/93

92/93

1/94

93/94

1/95

94/95

1/96

95/96

1/97

96/97

1/98

97/98

1/99

98/99

1/100

99/100

1/101

100/101

1/102

101/102

1/103

102/103

1/104

103/104

1/105

104/105

1/106

105/106

1/107

106/107

1/108

107/108

1/109

108/109

1/110

109/110

1/111

110/111

1/112

111/112

1/113

112/113

1/114

113/114

1/115

114/115

1/116

115/116

1/117

116/117

1/118

117/118

1/119

118/119

1/120

119/120

1/121

120/121

1/122

121/122

1/123

122/123

1/124

123/124

1/125

124/125

1/126

125/126

1/127

126/127

1/128

127/128

1/129

128/129

1/130

129/130

1/131

130/131

1/132

131/132

1/133

132/133

1/134

133/134

1/135

134/135

1/136

135/136

1/137

136/137

1/138

137/138

1/139

138/139

1/140

139/140

1/141

140/141

1/142

141/142

1/143

142/143

1/144

143/144

1/145

144/145

1/146

145/146

1/147

146/147

1/148

147/148

1/149

148/149

1/150

149/150

1/151

150/151

1/152

151/152

1/153

152/153

1/154

153/154

1/155

154/155

1/156

155/156

1/157

156/157

1/158

157/158

1/159

158/159

1/160

159/160

1/161

160/161

1/162

161/162

1/163

162/163

1/164

163/164

1/165

164/165

1/166

165/166

1/167

166/167

1/168

167/168

1/169

168/169

1/170

169/170

1/171

170/171

1/172

171/172

1/173

172/173

1/174

173/174

1/175

174/175

1/176

175/176

1/177

176/177

1/178

177/178

1/179

178/179

1/180

179/180

1/181

180/181

1/182

181/182

1/183

182/183

1/184

183/184

1/185

184/185

1/186

185/186

1/187

186/187

1/188

187/188

1/189

188/189

1/190

189/190

1/191

190/191

1/192

191/192

1/193

192/193

1/194

193/194

1/195

194/195

1/196

195/196

1/197

196/197

1/198

197/198

1/199

198/199

1/200

199/200

1/201

200/201

1/202

201/202

1/203

202/203

1/204

203/204

1/205

204/205

1/206

205/206

1/207

206/207

1/208

207/208

1/209

208/209

1/210

209/210

1/211

210/211

1/212

211/212

1/213

212/213

1/214

213/214

1/215

214/215

1/216

215/216

1/217

216/217

1/218

217/218

1/219

218/219

1/220

219/220

1/221

220/221

1/222

221/222

1/223

222/223

1/224

223/224

1/225

224/225

1/226

225/226

1/227

226/227

1/228

227/228

1/229

228/229

1/230

229/230

1/231

230/231

1/232

231/232

1/233

232/233

1/234

233/234

1/235

234/235

1/236

235/236

1/237

236/237

1/238

237/238

1/239

238/239

1/240

239/240

1/241

240/241

1/242

241/242

1/243

242/243

1/244

243/244

1/245

244/245

1/246

245/246

1/247

246/247

1/248

247/248

1/249

248/249

1/250

249/250

1/251

250/251

1/252

251/252

1/253

252/253

1/254

253/254

1/255

254/255

1/256

255/256

1/257

256/257

1/258

257/258

1/259

258/259

1/260

259/260

1/261

260/261

1/262

261/262

1/263

262/263

1/264

263/264

1/265

264/265

1/266

265/266

1/267

266/267

1/268

267/268

1/269

268/269

1/270

269/270

1/271

270/271

1/272

271/272

1/273

272/273

1/274

273/274

1/275

274/275

1/276

275/276

1/277

276/277

1/278

277/278

1/279

278/279

1/280

279/280

1/281

280/281

1/282

281/282

1/283

282/283

1/284

283/284

1/285

284/285

1/286

285/286

1/287

286/287

1/288

287/288

1/289

288/289

1/290

289/290

1/291

290/291

1/292

291/292

1/293

292/293

1/294

293/294

1/295

294/295

1/296

295/296

1/297

296/297

1/298

297/298

1/299

298/299

1/300

299/300

1/301

300/301

1/302

301/302

1/303

302/303

1/304

303/304

1/305

304/305

1/306

305/306

1/307

306/307

1/308

307/308

1/309

308/309

1/310

309/310

1/311

310/311

1/312

311/312

1/313

312/313

1/314

313/314

1/315

314/315

1/316

315/316

1/317

316/317

1/318

317/318

1/319

318/319

1/320

319/320

1/321

320/321

1/322

321/322

1/323

322/323

1/324

323/324

1/325

324/325

1/326

325/326

1/327

326/327

1/328

327/328

1/329

328/329

1/330

329/330

1/331

330/331

1/332

331/332

1/333

332/333

1/334

333/334

1/335

334/335

1/336

335/336

1/337

336/337

1/338

337/338

1/339

338/339

1/340

339/340

1/341

340/341

1/342

341/342

1/343

342/343

1/344

343/344

1/345

344/345

1/346

345/346

1/347

346/347

1/348

347/348

1/349

348/349

1/350

349/350

1/351

350/351

1/352

351/352

1/353

352/353

1/354

353/354

1/355

354/355

1/356

355/356

1/357

356/357

1/358

357/358

1/359

358/359

1/360

359/360

1/361

360/361

1/362

361/362

1/363

362/363

1/364

363/364

1/365

364/365

1/366

365/366

1/367

366/367

1/368

367/368

1/369

368/369

1/370

369/370

1/371

370/371

1/372

371/372

1/373

372/373

1/374

373/374

1/375

374/375

1/376

375/376

1/377

376/377

1/378

377/378

1/379

378/379

1/380

379/380

1/381

380/381

1/382

381/382

1/383

382/383

1/384

383/384

1/385

384/385

1/386

385/386

1/387

386/387

1/388

387/388

1/389

388/389

1/390

389/390

1/391

390/391

1/392

391/392

1/393

392/393

1/394

393/394

1/395

394/395

1/396

395/396

1/397

396/397

1/398

397/398

1/399

398/399

1/400

399/400

1/401

400/401

1/402

401/402

1/403

402/403

1/404

403/404

1/405

404/405

1/406

405/406

1/407

406/407

1/408

407/408

1/409

408/409

1/410

409/410

1/411

410/411

1/412

411/412

1/413

412/413

1/414

413/414

1/415

414/415

1/416

415/416

1/417

416/417

1/418

417/418

1/419

418/419

1/420

419/420

1/421

420/421

1/422

421/422

1/423

422/423

1/424

423/424

1/425

424/425

1/426

425/426

1/427

426/427

1/428

427/428

1/429

428/429

1/430

429/430

1/431

430/431

1/432

431/432

1/433

432/433

1/434

433/434

1/435

434/435

1/436

435/436

1/437

436/437

1/438

437/438

1/439

438/439

1/440

439/440

1/441

440/441

1/442

441/442

1/443

442/443

1/444

443/444

1/445

444/445

1/446

445/446

1/447

446/447

1/448

447/448

1/449

448/449

1/450

449/450

1/451

450/451

1/452

451/452

1/453

452/453

1/454

453/454

1/455

454/455

1/456

455/456

1/457

456/457

1/458

457/458

1/459

458/459

1/460

459/460

1/461

460/461

1/462

461/462

1/463

462/463

1/464

463/464

1/465

464/465

1/466

465/466

1/467

466/467

1/468

467/468

1/469

468/469

1/470

469/470

1/471

470/471

1/472

471/472

1/473

472/473

1/474

473/474

1/475

474/475

1/476

475/476

1/477

476/477

1/478

477/478

1/479

478/479

1/480

479/480

1/481

480/481

1/482

481/482

1/483

482/483

1/484

483/484

1/485

484/485

1/486

485/486

1/487

486/487

1/488

487/488

1/489

488/489

1/490

489/490

1/491

490/491

1/492

491/492

1/493

492/493

1/494

493/494

1/495

494/495

1/496

495/496

1/497

496/497

1/498

497/498

1/499

498/499

1/500

499/500

1/501

500/501

1/502

501/502

1/503

502/503

1/504

503/504

1/505

504/505

1/506

505/506

1/507

506/507

1/508

507/508

1/509

508/509

1/510

509/510

1/511

510/511

1/512

511/512

1/513

512/513

1/514

513/514

1/515

514/515

1/516

515/516

1/517

516/517

1/518

517/518

1/519

518/519

1/520

519/520

1/521

520/521

1/522

521/522

1/523

522/523

1/524

523/524

1/525

524/525

1/526

525/526

1/527

526/527

1/528

527/528

1/529

528/529

1/530

529/530

1/531

530/531

1/532

531/532

1/533

532/533

1/534

533/534

1/535

534/535

1/536

535/536

1/537

536/537

1/538

537/538

1/539

538/539

1/540

539/540

1/541

540/541

1/542

541/542

1/543

542/543

1/544

543/544

1/545

544/545

1/546

545/546

1/547

546/547

1/548

547/548

1/549

548/549

1/550

549/550

1/551

550/551

1/552

551/552

1/553

552/553

1/554

553/554

1/555

554/555

1/556

555/556

1/557

556/557

1/558

557/558

1/559

558/559

1/560

559/560

1/561

560/561

1/562

561/562

1/563

562/563

1/564

563/564

1/565

564/565

1/566

565/566

1/567

566/567

1/568

567/568

1/569

568/569

1/570

569/570

1/571

570/571

1/572

571/572

1/573

# Usability Problems - Client's Views

- Some students may not have the ability to read
  - Possible Solution
    - Audible Text
- There will be many types of users
  - Possible Solution
    - Personalization (registration and login)

# Usability Problems - Group's Views

- The tablet may be too small.
    - We'll be using a 7" tablet (ver.2.2) as opposed to the larger 10" tablets on the market since that is what is available to us.
  - Must address different users with different disabilities
    - Possible to have one lesson design for a variety of user disabilities?
  - Dragging vs. Touch & Point capability
    - Touch & point is a solution to dragging difficulty
- Confusion from going between mat and tablet

# Methodology

- **Testing**
  - Will test application with users in public library in school area
  - Will record (audio & video) user interaction for comparison and analysis
- **Interviewing**
  - Interview 5-8 students
  - Learn about their experience with the application
  - Collect demographics and background statistics
- **2 Testing Rounds**
  - May 5th
  - May 26th

# Testing & Interviewing:

## Types of Users & User Subgroups

- Will test on and interview at least 5-8 students in each test (total 10-16)
- Subgroups
  - Middle School Students
    - will be teaching them K-6 grade math
  - Learning Handicapped
  - Autistic
  - Physically Handicapped
- Our Focus
  - 4-6 grade students in RSP (Resource Specialist Program) and Autistic students



# Testing & Interviewing: Contacting and Meeting With Users

- Will utilize resources available from client
- Testing
  - ideally conducted at their school
  - 10-15 minutes per user
- Interviewing
  - will be conducted right after testing
  - will develop simple non-prejudicial satisfaction scale

# Testing & Interviewing: User Tasks

- Tasks
  - complete both lessons
    - Fraction Lesson
    - Multiplication Lesson
- Measuring Usability
  - Will measure...
    - time needed to perform task
    - error rate
    - user satisfaction (after and during the experiment)

# Testing & Interviewing: Questions for the Users

- Background & Demographic Question  
Examples:
  - What is your favorite subject? (Is it math?)
  - What math skill do you like do you like most: Fractions, Addition, Subtraction, etc.
- Usability Question Examples:
  - Do you feel you understand the topics more after completing the lessons?
  - Was the application easy or difficult to use? What do you think was easiest or most difficult?
  - Did you feel satisfied or unsatisfied during the lessons? How about after the lessons?

# Phases of Research & Timeline

- Phase 1: Requirements
  - Week 1 & 2
- Phase 2: Design & Feedback from 131/132 Peers
  - Week 3 & 4
- Phase 3: Wire Frame Development
  - Week 4 & 5
- Phase 4: First Round Usability Testing
  - Late Week 5 (May 5)
- Phase 5: Modification & Development
  - Week 6 & 7
- Phase 6: Second Round of Testing
  - Week 8 (May 26)
- Phase 7: More modification & Finalize Development
  - Week 9 & 10

# Plan and Task Distributions

- Overall Group Task
  - Learn Java language and Android Programming
  - Create Two math teaching lessons at Medium Level
- Individual Participation in Study/Interview (tentative)
  - Danny: Recorder and Note taker
  - Jay: Goes through administrative details and conduct interview/interact with parents
  - Kathy: Directing the user (kids) through the experiment and application

**Questions?**