Lecture 1 – Introduction

Autumn 2016-2017
Workshop Staff

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Workshop Goals

Build modern, usable and winning product

Use technology for better health

Learn (a mini startup)

- How to define a real product
- Product development process – “from idea to production”
- Cloud, mobile and wearable application development and integration
Preliminaries

- Students will group in teams of 2-3 students.
- Each group will come up with a project for the semester.
- Project will include designing and developing a live system using Phones, Azure – Microsoft cloud and a Band
- You can come up with your own idea or develop one of our suggested ideas
Workshop meetings will take place on Monday 9-11


**Attendance** in all meetings is **mandatory**

Feedback will be given along the way

Wiki: Please register and sign up for teams

[https://tauehealthapps.wikispaces.com](https://tauehealthapps.wikispaces.com)

Join code: NMJFT7K (Expires weekly – check website)

Emails: Sent to: Yehuda, Nir, Shir *(All three of us)*

Subject: W8Workshop – Group # -

Tentative Schedule

• Meeting 1, 31/10/2016 (today)
  ➢ Introduction (by Yehuda), Admin (by Shir) Intro to eHealth + Product planning (by Nir)

• Meeting 2, 07/11/2016
  ➢ Project ideas discussion (by Dr. Elad Yom-Tov)

Homework:
• Form teams (start right now!)
• Brainstorm for ideas
• Until the end of this week – sign up teams in Wiki
Tentative Schedule

• Meeting 3, **14/11/2016**
  - Azure + End-to-end phone app development (by Alon)

  **Milestone 1: By November 14** – email with detailed project ideas

• Meeting 4, **21/11/2016**
  - End-to-end phone app development and Xamarin (by Alon)
Tentative Schedule

• Meeting 5, 28/11/2016
  ➢ Meeting with each group to finalize project ideas
    o Prepare your best ideas so that we can discuss them
    o You should email us your ideas ahead of time

Milestone 2: November 28 – Presentation including: Use case, Target users, Technologies, High level development plan, Screen Mockups

• Meeting ?, 07/12/2016 (17:00-20:00)
  ➢ Complete lesson on technical background
Tentative Schedule

• Meeting 6, 12/12/2016
  ➢ Proof of Concept presentation (slides + demo) + Design document submission
    o End-to-End Implementation of your main use case
    o UI mockups very helpful

Milestone 3: December 12 – POC (Presentation + demo) + High-Level Design Document submission

Milestone 4: December 26 – Detailed Design Document submission
Tentative Schedule

• Meeting 7, 23/01/2017
  ➢ Project demo presentation – meeting with each group
    – Show significant progress from POC

Milestone 5: January 23 – Beta(presentation + demo) –
Main use case should work

Milestone 6: February 27 – Release candidate – video submission

• Meeting 8, 30/03/2017
  – Final Project presentation and submission

Milestone 7: March 30 – Final presentation + demo +
project documentation
Grading Criteria

Final submission 100%

Grading criteria:
- Interesting ideas and use case
- Technical difficulty
- Finishing level of application (no bugs, features behave as expected, features that were discussed along the semester were implemented)
- Usability (UI, UX, documentation and help, intuitive application which serves the user's expectations for the specific use case etc.)

• Extra points will be given for: challenging projects, live projects, original ideas
It's not an easy workshop…
But it's worth it!
Let's Start!
eHealth (Wikipedia)

• **Electronic health record**: enabling the communication of patient data between different healthcare professionals
• **Computerized physician order entry**: a means of communicating diagnostic tests/treatments electronically
• ePrescribing: printing prescriptions to patients and electronic transmission of prescriptions from doctors to pharmacists
• **Clinical decision support system**: providing information electronically about protocols and standards for healthcare professionals to use in diagnosing and treating patients
• **Telemedicine**: physical and psychological diagnosis and treatments at a distance, including telemonitoring of patients functions
• **Consumer health informatics**: use of electronic resources on medical topics by healthy individuals or patients;
• Health **knowledge management**: e.g. in an overview of latest medical journals, best practice guidelines or epidemiological tracking
• **Virtual healthcare teams**: consisting of healthcare professionals who collaborate and share information on patients
• **mHealth or mobile health**: includes the use of mobile devices in collecting aggregate and patient level health data, providing healthcare information to practitioners, researchers, and patients, real-time monitoring of patient vitals, and direct provision of care (via mobile telemedicine);
• **Medical research using grids**: powerful computing and data management capabilities to handle large amounts of heterogeneous data.
• **Health informatics / healthcare information systems**: also often refer to software solutions for appointment scheduling, patient data management, work schedule management and other administrative tasks surrounding health
Mobile Health

• There are now around 165,000 health-related apps which run on one or other, Apple’s iOS and Google’s Android
• So far, most smartphone health apps fall squarely into the category of “Wellness”, along with portable sensors

Source: http://ww2.cfo.com/mobile/2016/03/health-care-things-looking-app/
Tremor Monitoring & Fall detection

http://team8ws.wixsite.com/workshop
Example Projects

• Sleeping App (Sleep cycle alarm clock, mini sleep lab etc.)

• Sun smart app (monitor sun exposure, reminder to use sun screen based on skin type and UV exposure, etc.)

• Stress project with Rambam

• ?
Our Tools

- Optical heart rate monitor
- Three-axis accelerometer/gyrometer
- Barometer
- GPS
- Microphone
- Ambient light sensor
- Galvanic skin response sensors
- UV sensor
Optical Heart Rate Monitoring

- Most wearables with heart rate monitors today use a method called photoplethysmography (PPG) to measure heart rate.
  - PPG is a technical term for shining light into the skin and measuring the amount of light that is scattered by blood flow.
  - Each cardiac cycle the heart pumps blood to the periphery, enough to distend the arteries and arterioles in the subcutaneous tissue and be measured from the skin.

- Main technical components used by PPG to measure heart rate:
  - Optical emitter
  - Processing unit
  - Accelerometer
Our Tools

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Workshop Topics

Introduction and product planning

Developing for the cloud

- Azure Infrastructure and Services
  - Storage
  - SQL Azure & Document DB
  - Virtual Machines
  - Microsoft Health Cloud API
- Azure App Service
  - Web Apps
  - API Apps
  - Logic Apps
  - Mobile Apps

Universal Windows Platform Development

- Introduction to Windows 10 & UWP
- Introduction to XAML
  - Universal Controls & Layout Panels
- Introduction to MVVM
- Adaptive UI
- Navigation
- Live Tiles
- Cortana Integration & Activation
- Consuming Cloud Services
- Cross platform development with Xamarin Forms
Product Planning
The **product manager** is the person responsible for defining the 'why', 'what,' and 'when' of the **product** that the engineering team will build. They are the CEO of their **product** - which means they lead cross-functional teams from a **product's** conception through to its launch.
You are here
“A great product manager has the brain of an engineer, the heart of a designer and the speech of a diplomat”
Key Elements of Product Planning

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<th>Voice of Customer</th>
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<td>• Who is the target audience?</td>
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<td>• New trends: cloud/mobile</td>
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Key Elements of Product Planning

**Voice of Customer**
- Who is the target audience?
- What are the needs and pain points?
- What’s the value proposition?
- Who is the customer base today? Can we grow/evolve it?

**Voice of Business**
- Who are the key players?
- What the competition is doing?
- What’s the business potential? (revenue, users, margins, etc.)
- What analysts/press are saying?

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**Build-Measure-Learn**
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Overview:
Red oceans represent all the industries in existence today, with companies try
to outperform their. Blue oceans, represent all the industries not in
existence today, where competition is not present

Industry examples:
• Blue: Wii
• Red: HTC

So what?
• Are your product in Red or Blue oceans?
• Can the conversation change from Red to Blue Ocean?
Overview:
The five forces framework is an approach for analyzing the competitive nature of an industry to gain an understanding of key factors influencing the profitability and attractiveness of an industry.

Industry examples:
- Suppliers: Pinterest, Google, Amdocs
- Buyers: Pinterest, Amdocs
- New Entrants: Netflix, Amazon Web Services
- Substitutes: Netflix, Amazon Web Services

So what?
- For your product/feature who is/are the new entrants trying to disrupt the market?
- What are the substitutes?
- Are you impacted with strong suppliers’ or buyers’ power?
### Growth-Share Matrix

**Overview**
The Growth-Share matrix is a tool for evaluating the performance of firm’s products or business units versus the performance of the industry.

<table>
<thead>
<tr>
<th>Market Growth</th>
<th>Market Share</th>
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<tr>
<td>Low</td>
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<tr>
<td>High</td>
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<table>
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<tr>
<th>(Question Mark: High Growth - Low Share)</th>
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<tbody>
<tr>
<td>- Represent potential for the firm but currently weak competitive position</td>
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<tr>
<td>- Require cash to become star</td>
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<td><strong>Common mistake:</strong> throw resources at all of them</td>
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<th>(Star: High Growth - High Share)</th>
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<td>- Significant opportunities for long-term earnings</td>
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<tr>
<td>- Objective is to grow at least as fast as the market</td>
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<tr>
<td>- Require cash to sustain growth</td>
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<td><strong>Common mistake:</strong> try to maximize short-term</td>
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<th>(Dog: Low Growth - Low Share)</th>
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<tr>
<td>- Poor cost position in low growth markets</td>
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<tr>
<td>- Should be managed/divested for cash</td>
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<td><strong>Common mistake:</strong> spend resources trying to fix them</td>
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<th>(Cash Cow: Low Growth - High Share)</th>
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<td>- Should generate significant profits</td>
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<tr>
<td>- Should generate cash to be invested in other businesses</td>
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<td><strong>Common mistake:</strong> spend cash on themselves rather than fund other efforts</td>
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**So what?**
- Understand why investments are made
- Justify your place and tune the conversation
- If you are a dog, find growth opportunities
- Remember: growth can be in users first and revenue/margins later

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**Common mistake:** spend cash on themselves rather than fund other efforts.
**Overview:**
SWOT is a method of analyzing an organization by looking at its strengths and weaknesses and the opportunity and threats which it faces.

**Strengths**
Characteristics of the business that give it an advantage over others

- Cost advantage
- Financial resources
- Customer loyalty
- Modern production facilities
- Patents

**Weaknesses**
Characteristics that place the business at a disadvantage relative to others

- Too narrow a product line
- Lack of management depth
- High cost operation due to high labor costs
- Weak Market image

**Opportunities**
Elements that the project could exploit to its advantage

- Add to the product line
- Enter new market
- Acquire firms with needed technology

**Threats**
Elements in the environment that could cause trouble for the business

- Shifting buyer tastes
- Likely entry of new competitors
- Unfavorable government policies
- Potential for technology to radically change image

**So what?**
- Powerful framework to assess competition
- You must need this for your product!
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### Build-Measure-Learn
- Build/Measure/Learn faster
- Establish baseline and make changes based on learning
The **compelling promise** that a product makes to a **target audience** that outweighs its **total perceived cost and risk** while being **differentiated** from available alternatives and **supported** by reasons to believe.
Enterprise is the neighborhood car rental company that specializes in renting to consumers who need a replacement car as the result of an accident, mechanical repair or theft, and those who need a vehicle for a special occasion. Enterprise’s 7,000 branches are located close to where our customers live and work, and more than 90% of Americans live within 15 minutes of an Enterprise branch.
Overview:
Different needs between “early adopters” and “early and majority” creates a chasm that is hard for companies to cross. Companies need to focus on one target audience at a time and develop the right features, positioning, marketing strategy and pricing, before moving to the next group of users.

Industry example:

So what?
• Where is your product/feature on the curve?
• What the audience in the next tier need?
• What should be the message to that audience?
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Traditional Product Development
Faster Learning and Pivoting

http://www.youtube.com/watch?v=fEvKo90qBns

The Three Learning Milestones

1. Establish the baseline
   - Build a Minimum Viable Product (MVP)
   - Measure how customers behave right now

2. Tune the engine
   - Experiment to see if we can improve metrics from the baseline towards the ideal

3. Pivot or persevere
   - When experiments reach diminishing returns, it’s time to pivot.
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