

1 **Platform-Based Development (PBD)**

2 Platform-based development is concerned with the design and development of software
3 applications that reside on specific software platforms. In contrast to general purpose
4 programming, platform-based development takes into account platform-specific constraints. For
5 instance web programming, multimedia development, mobile computing, app development, and
6 robotics are examples of relevant platforms which provide specific services/APIs/hardware
7 which constrain development. Such platforms are characterized by the use of specialized APIs,
8 distinct delivery/update mechanisms, and being abstracted away from the machine level.
9 Platform-based development may be applied over a wide breadth of ecosystems.

10 While we recognize that some platforms (e.g., web development) are prominent, we are also
11 cognizant of the fact that no particular platform should be specified as a requirement in the
12 CS2013 curricular guidelines. Consequently, this Knowledge Area highlights many of the
13 platforms which have become popular, without including any such platform in the core
14 curriculum. We note that the general skill of developing with respect to an API or a constrained
15 environment is covered in other Knowledge Areas, such as SDF-Software Development
16 Fundamentals. Platform-based development further emphasizes such general skills within the
17 context of particular platforms.

18

19 **PBD. Platform-Based Development (Elective)**

	Core-Tier1 hours	Core-Tier2 hours	Includes Electives
PBD/Introduction			Y
PBD/Web Platforms			Y
PBD/Mobile Platforms			Y
PBD/Industrial Platforms			Y
PBD/Game Platforms			Y

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21

22 **PBD/Introduction**

23 *[Elective]*

24 This unit describes the fundamental differences that Platform-Based Development has over
25 traditional software development.

26 *Topics:*

- 27 • Overview of platforms (Web, Mobile, Game, Industrial etc)
- 28 • Programming via platform-specific APIs
- 29 • Overview of Platform Languages (Objective C, HTML5, etc)
- 30 • Programming under platform constraints

31

32 *Learning Outcomes:*

33 [Elective]

- 34 1. Describe how platform-based development differs from general purpose programming [Familiarity]
- 35 2. List characteristics of platform languages [Familiarity]
- 36 3. Write and execute a simple platform-based program [Usage]
- 37 4. List the advantages and disadvantages of programming with platform constraints [Familiarity]

38

39 **PBD/Web Platforms**

40 *[Elective]*

41 *Topics:*

- 42 • Web programming languages (HTML5, Java Script, PHP, CSS, etc.)
- 43 • Web platform constraints
- 44 • Software as a Service (SaaS)
- 45 • Web standards

46

47 *Learning Outcomes:*

48 [Elective]

- 49 1. Design and Implement a simple web application [Usage]
- 50 2. Describe the constraints that the web puts on developers [Familiarity]
- 51 3. Compare and contrast web programming with general purpose programming [Assessment]
- 52 4. Describe the differences between Software-as-a-Service and traditional software products [Familiarity]
- 53 5. Discuss how web standards impact software development [Familiarity]
- 54 6. Review an existing web application against a current web standard [Assessment]

55

56 **PBD/Mobile Platforms**

57 *[Elective]*

58 *Topics:*

- 59 • Mobile Programming Languages (Objective C, Java Script, Java, etc.)
- 60 • Challenges with mobility and wireless communication
- 61 • Location-aware applications
- 62 • Performance / power tradeoffs

- 63 • Mobile platform constraints
64 • Emerging Technologies
65

66 **Learning Outcomes:**

67 [Elective]

- 68 1. Design and implement a mobile application for a given mobile platform. [Usage]
69 2. Discuss the constraints that mobile platforms put on developers [Familiarity]
70 3. Discuss the performance vs. power tradeoff [Familiarity]
71 4. Compare and Contrast mobile programming with general purpose programming [Assessment]
72

73 **PBD/Industrial Platforms**

74 **[Elective]**

75 This knowledge unit is related to IS/Robotics.

76 **Topics:**

- 77 • Types of Industrial Platforms (Mathematic, Robotics, Industrial Controls, etc.)
78 • Robotic Software and its Architecture
79 • Domain Specific Languages
80 • Industrial Platform Constraints
81

82 **Learning Outcomes:**

83 [Elective]

- 84 1. Design and implement an industrial application on a given platform (Lego Mindstorms, Matlab, etc.)
85 [Usage]
86 2. Compare and contrast domain specific languages with general purpose programming languages.
87 [Assessment]
88 3. Discuss the constraints that a given industrial platforms impose on developers [Familiarity]
89

90 **PBD/Game Platforms**

91 **[Elective]**

92 **Topics:**

- 93 • Types of Game Platforms (XBox, Wii, PlayStation, etc)
94 • Game Platform Languages (C++, Java, Lua, Python, etc)
95 • Game Platform Constraints
96

97 **Learning Outcomes:**

98 [Elective]

- 99 1. Design and Implement a simple application on a game platform. [Usage]
100 2. Describe the constraints that game platforms impose on developers. [Familiarity]
101 3. Compare and contrast game programming with general purpose programming [Assessment]