**Social Issues and Professional Practice**

**Outcomes Assessment Assignment**

This major assignment is based on expected learning outcomes as expressed in the Computer Science Curriculum of 2013 (Ironman Draft) as published by the Joint Task Force on Computing Curricula (Association for Computing Machinery and IEEE-Computer Society). It ties closely to ABET Accreditation expected outcomes for computer science students.

Under each Learning Outcomes section below, specific expected curriculum outcomes are listed. These are followed by questions in **bold** font that have been written by your instructor. You will answer the questions shown in **bold**.

All students are expected to exhibit measurable competence in responding to each of the questions. However, you will initially respond in writing only to a subset of eight assigned questions and you will lead discussions in class related to your responses.

All students eventually will have access to the responses of all other students. In this manner, all students will acquire knowledge concerning all of the questions. Feel free to add to or provide counter perspectives to the responses provided by your peers. Many questions will be revisited on the final exam.

For those questions assigned to you, your responses will be assessed relative to the following scale: ***Does Not Meet Expectations / Almost Meets Expectations / Meets Expectations / Exceeds Expectations***. Selected questions will also be assessed using **Association of Colleges and Universities Standard Rubrics**. These additional rubrics accompany the selected questions and you should strive to meet the highest rating in your response. Your collection of eight individually rewritten responses will count towards 20% of your grade in the course. Use complete and well-constructed sentences.

**Assessment**:

(a) If your assessment on a specific question is “Does Not Meet Expectations,” you will be required to submit a revised and expanded response.

(b) If you fail to meet a ranking of 3 or 4 under an applicable ACU Standard Rbric, you will be required to rewrite and resubmit until you achieve that level.

(c)Unless all of your questions are completed at a satisfactory level by the end of the course you will receive an Incomplete (I) for your grade in the course.

**Process:** Please copy this Word document and eliminate all material except those 4-question blocks of material below that pertain to your assigned questions. Respond with an appropriate response to each question where you see the word **Response:.** Include the assessment scale after each question in the material you retain. Do not change the formatting style in the Word document that you submit. That is, submit your response in Word format using the existing formatting of this document you are reading (left justified, Times, 11 font, single spaced with NO spacing before or after each line and NO line or paragraph indentations). For each of the two sets of four questions assigned to you, send your ***attached document*** response to ***BlackBoard*** under ***ACM-IEEE Outcomes Assessment Submissions*** with a title taking the form of ***YourLastName – OA Questions 5-8***.

In preparing your responses, you will recognize many topics yet to be covered in the course. You may use any of the reading and lecture materials from the course as well as any additional external written resources and readings to construct your responses. You may NOT consult with other humans.

Please **cite your sources** if you consult written material other than your own memory. Use very truncated citations if you consult specific sources in preparing your response. Examples: (Isaacson in course bibliography, Chap 3, p. 92), (Wikipedia under the term “intangible digital intellectual property”), (Andy Greenburg, The Untold Story of NotPetya, the Most Devastating Cyberattack in History, Wired Magazine, Aug 2018), etc.

If you discover more information germane to your responses as we address further topics in the course and prior to the final rewrite due date, feel free to expand upon your responses. You should assume that your digital responses will be checked for plagiarism against the responses of your peers, past students in the course, and against the published literature and Web using facilities such as TurnItIn, Grammarly, etc. (i.e the latest commercial plagiarism checking system used by professors to which UMaine subscribes and submits student products.) Submission of plagiarized material will result in a failing grade in the course.

**Due Dates:**

Responses to Questions: **as indicated on the online syllabus**

Returned by instructor to students of low rated and marked up responses: **as appropriate**

Final rewrite due date for unsatisfactory responses: **Friday Oct 12, 8:00 pm**

**Outcomes Assessment Topics**

|  |  |  |
| --- | --- | --- |
|  | **TOPIC** | **QUESTIONS** |
| **OA I.** | **SOCIAL CONTEXT** | **1-10** |
| **OA II.** | **ANALYTICAL TOOLS** | **11-14** |
| **OA III.** | **PROFESSIONAL ETHICS** | **15-27** |
| **OA IV.** | **INTELLECTUAL PROPERTY** | **28-39** |
| **OA V.** | **PRIVACY AND CIVIL LIBERTIES** | **40-46** |
| **OA VI.** | **PROFESSIONAL COMMUNICATION** | **47-53** |
| **OA VII.** | **HISTORY** | **54-57** |
| **OA VIII.** | **ECONOMIES OF COMPUTING** | **58-62** |
| **OA IX.** | **SECURITY AND COMPUTER CRIMES** | **63-69** |

**I. SOCIAL CONTEXT**

Computers and the Internet, perhaps more than any other technology, have transformed society over the past 50 years, with dramatic increases in human productivity; an explosion of options for news, entertainment, and communication; and fundamental breakthroughs in almost every branch of science and engineering.

Topics:

[Core-TieR 1]

• Social implications of computing in a networked world (cross-reference HCI/Foundations/social models; IAS/Fundamental Concepts/social issues)

• Impact of social media on individualism, collectivism and culture.

[Core-Tier2]

• Growth and control of the Internet (cross-reference NC/Introduction/organization of the Internet)

• Often referred to as the digital divide, differences in access to digital technology resources and its resulting ramifications for gender, class, ethnicity, geography, and/or underdeveloped countries.

Accessibility issues, including legal requirements

• Context-aware computing (cross-reference HC/Design for non-mouse interfaces/ ubiquitous and context-aware)

**Learning Outcomes:**

[Core-Tier1]

1. Describe positive and negative ways in which computer technology (networks, mobile computing, cloud computing) alters modes of social interaction at the personal level. [Familiarity]

**Question: Describe at least three positive ways in which computer technology (digital social networks, mobile computing, cloud computing) alters modes of social interaction at the personal level. Then describe at least three negative ways in which computer technology (digital social networks, mobile computing, cloud computing) alters modes of social interaction at the personal level. Provide an example of each from your personal experience.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

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| --- | --- | --- | --- | --- |
| **AAC&U Rubric 2:** Analysis of Knowledge | Student connects and extends knowledge (facts, theories, etc.) from one's own academic study/field/discipline to civic engagement and to one's own participation in civic life, politics, and government. | Student analyzes knowledge (facts, theories, etc.) from one's own academic study/field/discipline making relevant connections to civic engagement and to one's own participation in civic life, politics, and government. | Student begins to connect knowledge (facts, theories, etc.) from one's own academic study/field/discipline to civic engagement and to tone's own participation in civic life, politics, & gov’t. | Student begins to identify knowledge (facts, theories, etc.) from one's own academic study/field/discipline that is relevant to civic engagement and to one's own participation in civic life, politics, and gov’t. |
|  | 4 | 3 | 2 | 1 |
|  | ☐ | ☐ | ☐ | ☐ |

2. Identify developers’ assumptions and values embedded in hardware and software design, especially as they pertain to usability for diverse populations including under-represented populations and the disabled. [Familiarity]

**Question: Provide two or more examples of hardware or design concepts that can enable greater computer usability by those that are blind or deaf.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

3. Interpret the social context of a given design and its implementation. [Familiarity]

**Question: Provide and expand upon at least two arguments supporting the proposition that the design and implementation of Amazon.com and its financial model for generating profits supports equitable access to wealth generation across broad ranging sectors of society in the U.S. Then provide and expand upon at least two arguments supporting the proposition that the design and implementation of Amazon and its financial model for generating profits supports primarily increased wealth for the wealthiest 1% of Americans and/or those with access to the detailed tracking information gathered by Amazon. Are you personally primarily benefitted or disadvantaged by the design and implementation? Local businesses primarily benefitted or disadvantaged? Large national and international businesses and governments?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

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| **AAC&U Rubric 32:** **Personal and Social Responsibility** | Student takes informed and responsible action to address ethical, social, and environmental challenges in global systems and evaluates the local and broader consequences of individual and collective interventions.  | Student analyzes the ethical, social, and environmental consequences of global systems and identifies a range of actions informed by one’s sense of personal and civic responsibility.  | Student explains the ethical, social, and environmental consequences of local and national government or corporate decisions on global systems.  | Student identifies basic ethical dimensions of some local or national government or corporate decisions that have global impact. |
|  | 4 | 3 | 2 | 1 |
|  | ☐ | ☐ | ☐ | ☐ |

4. Evaluate the efficacy of a given design and implementation using empirical data. [Assessment]

**Question: Describe the human-computer interaction empirical data you would gather to determine whether users are able to quickly and efficiently find desired information on a website.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

5. Investigate the implications of social media on individualism versus collectivism and culture. [Usage]

**Question: Provide and discuss two or more specific examples where social media has allowed a group or community to accomplish a positive action that is highly likely not to have been accomplished without the social media capability (examples: fundraising for a project, forcing government officials to act, outing of sexual predators, etc.). Provide and discuss two or more specific examples where social media has allowed a group or community to accomplish a negative or unethical action that is highly likely not to have been accomplished without the social media capability.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
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| **AAC&U Rubric 15:** **Influence of context and assumptions** | Student thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position. | Student identifies own and others' assumptions and several relevant contexts when presenting a position. | Student questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa). | Student shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position. |
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|  | ☐ | ☐ | ☐ | ☐ |

[Core-Tier2]

6. Discuss how Internet access serves as a liberating force for people living under oppressive forms of government; explain how limits on Internet access are used as tools of political and social repression. [Familiarity]

**Question: Discuss approaches used by government to track and control the activities of citizens using the Internet in China or Iran. Then discuss approaches or means that some citizens may be using to circumvent these controls.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

7. Analyze the pros and cons of reliance on computing in the implementation of democracy (e.g. delivery of social services, electronic voting). [Assessment]

**Question: Discuss some benefits of using open discussion lists or blogs for communicating opinions on an important issue within a community (such as the University of Maine community) and using websites such as Opavote to accomplish a referendum vote among members of the community. Discuss limitations or drawbacks of using such digital communication and vote gathering approaches.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

8. Describe the impact of the under-representation of diverse populations in the computing profession (e.g., industry culture, product diversity). [Familiarity]

**Question: Provide one or more examples of a digital product or service designed and implemented primarily by a person or team from a racial or ethnic minority. Provide one or more examples of a digital product or service designed and implemented primarily by one or more women. Hypothesize and discuss how each of these products or services might have taken a different path, had a different result or never been produced if designed by an all male caucasion team.**

**Response:** placeyourresponsehere

Reference(s) (if any):

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| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
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| **AAC&U Rubric 53:** **Skills - Empathy** | Student interprets intercultural experience from the perspectives of own and more than one worldview and demonstrates ability to act in a supportive manner that recognizes the feelings of another cultural group. | Student recognizes intellectual and emotional dimensions of more than one worldview and sometimes uses more than one worldview in interactions. | Student identifies components of other cultural perspectives but responds in all situations with own worldview. | Student views the experience of others but does so through own cultural worldview. |
|  | 4 | 3 | 2 | 1 |
|  | ☐ | ☐ | ☐ | ☐ |

9. Investigate the implications of context awareness in ubiquitous computing systems. [Usage]

**Question: If your cell phone is tracking your location at all times when the battery is in the phone, provide two or more examples of context aware capabilities that might be used by industry to better achieve their profit generation goals.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

**II. ANALYTICAL TOOLS**

Ethical theories and principles are the foundations of ethical analysis because they are the viewpoints from which guidance can be obtained along the pathway to a decision. Each theory emphasizes different points such as predicting the outcome and following one's duties to others in order to reach an ethically guided decision. However, in order for an ethical theory to be useful, the theory must be directed towards a common set of goals. Ethical principles are the common goals that each theory tries to achieve in order to be successful. These goals include beneficence, least harm, respect for autonomy and justice.

Topics:

 [Core-Tier1]

• Ethical argumentation

• Ethical theories and decision-making

• Moral assumptions and values

**Learning Outcomes:**

[Core-Tier1]

10. Evaluate stakeholder positions in a given situation. [Assessment]

**Question: Name primary stakeholders in the electronic licensing of college textbooks. What are the interests that each stakeholder might hope to advance?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

11. Analyze basic logical fallacies in an argument. [Assessment]

**Question: Define logical fallacy, provide at least two specific examples of arguments with logical fallacies and explain why the reasoning is faulted.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

12. Analyze an argument to identify premises and conclusion. [Assessment]

**Question: Proposition: Because many University of Maine System students, staff and faculty have children in the Maine public school system, the academic calendars of all University of Maine System campuses should be altered to match that of the Maine public school system. What are premises and assumptions upon which this argument may be based? Assuming the first phrase of the argument to be true, what might be an alternative supportable conclusion and why?**

**Response:** placeyourresponsehere

Reference(s) (if any):

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| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

13. Illustrate the use of example and analogy in ethical argument. [Usage]

**Question: Assume that one of your friends has attached an electronic tracking device to his neighbor’s car without the knowledge of the neighbor. Provide an *example* of a similar tracking instance that society has deemed to be appropriate or inappropriate. Provide an *analogy* as to why the tracking behavior is or is not ethically supportable.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

14. Evaluate ethical/social tradeoffs in technical decisions. [Assessment]

**Question: Articulate a true ethical dilemma in which any of two or more information system design and implementation approaches might benefit a significant population of people but will have adverse consequences for others. Describe some steps in how to assess and resolve the dilemma.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

**III. PROFESSIONAL ETHICS**

Computer ethics is a branch of practical philosophy which deals with how computing professionals should make decisions regarding professional and social conduct. There are three primary influences: 1) The individual's own personal code, 2) Any informal code of ethical behavior existing in the work place, and 3) Exposure to formal codes of ethics.

Topics:

[Core-Tier1]

• Community values and the laws by which we live

• The nature of professionalism including care, attention and discipline, fiduciary responsibility, and mentoring

• Keeping up-to-date as a professional in terms of familiarity, tools, skills, legal and professional framework as well as the ability to self-assess and computer fluency

• Professional certification, codes of ethics, conduct, and practice, such as the ACM/IEEE-CS, SE, AITP, IFIP and international societies (cross-reference IAS/Fundamental Concepts/ethical issues)

• Accountability, responsibility and liability (e.g. software correctness, reliability and safety, as well as ethical confidentiality of cybersecurity professionals)

[Core-Tier2]

• The role of the professional in public policy

• Maintaining awareness of consequences

• Ethical dissent and whistle-blowing

• Dealing with harassment and discrimination

• Forms of professional credentialing

• Acceptable use policies for computing in the workplace

• Ergonomics and healthy computing environments

• Time to market and cost considerations versus quality professional standards

**Learning Outcomes:**

 [Core-Tier1]

15. Identify ethical issues that arise in software development and determine how to address them technically and ethically. [Familiarity]

**Question: Describe at least three software design or implementation actions that likely would not violate laws in the U.S. but that would violate one or more of the prima facie duties that are always in force for every decision affecting others under the ethical concepts of Principlism as set forth by Beauchamp and Childress.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

16. Recognize the ethical responsibility of ensuring software correctness, reliability and safety. [Familiarity]

**Question: Where can you find the articulation of your legal duties to others in supporting the correctness, reliability, security and safety of code to which you have contributed? Above and beyond legal duties, what is your ethical responsibility to others in supporting the correctness, reliability, security and safety of code to which you have contributed? Does and should society expect you to share responsibility for unintended uses of your code by the public and why?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

17. Describe the mechanisms that typically exist for a professional to keep up-to-date. [Familiarity]

**Question: Describe at least three mechanisms by which computer scientists may keep up-to-date with latest advancements and/or professional responsibilities throughout your careers. Reflect on the degree which practicing professionals are or might be motivated to use these mechanisms and do use these mechanisms. What do you envision as primary means by which you are likely to keep up to date in your profession a decade from now?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

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| --- | --- | --- | --- | --- |
| **AAC&U Rubric 24:** Curiosity | Student explores a topic in depth, yielding a rich awareness and/or little-known information indicating intense interest in the subject. | Student explores a topic in depth, yielding insight and/or information indicating interest in the subject. | Student explores a topic with some evidence of depth, providing occasional insight and/or information indicating mild interest in the subject. | Student explores a topic at a surface level, providing little insight and/or information beyond the very basic facts indicating low interest in the subject. |
|  | 4 | 3 | 2 | 1 |
|  | ☐ | ☐ | ☐ | ☐ |

18. Describe the strengths and weaknesses of relevant professional codes as expressions of professionalism and guides to decision-making. [Familiarity]

**Question: What are strengths of professional codes of conduct in guiding your design of a software app or an information system? What are weaknesses of professional codes of conduct in guiding your design of a software app or an information system? What are additional or alternative touchstones in providing ethical guidance? What practical principles might an ethicist follow in resolving an ethical dilemma?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

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| --- | --- | --- | --- | --- |
| **AAC&U Rubric 21:** **Application of** **Ethical Perspectives/****Concepts** | Student can independently apply ethical perspectives/concepts to an ethical question, accurately, and is able to consider full implications of the application. | Student can independently apply ethical perspectives/concepts to an ethical question, accurately, but does not consider the specific implications of the application. | Student can apply ethical perspectives/concepts to an ethical question, independently (to a new example) and the application is inaccurate. | Student can apply ethical perspectives/concepts to an ethical question with support (using examples, in a class, in a group, or a fixed-choice setting) but is unable to apply ethical perspective or concepts independently (to a new example.). |
|  | 4 | 3 | 2 | 1 |
|  | ☐ | ☐ | ☐ | ☐ |

19. Analyze a global computing issue, observing the role of professionals and government officials in managing this problem. [Assessment]

**Question: Provide examples of how you as an employee of a large corporation or government agency or as an independent contractor programmer could help support the *autonomy* of individual users of the digital products and services you help develop. The ethical principle of autonomy is defined as the duty to support or help enable self-determination in defining, planning and pursuing a good life in self and others.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

20. Evaluate the professional codes of ethics from the ACM, the IEEE Computer Society, and other organizations. [Assessment]

**Question: Study and compare the ACM Core of Ethics and Professional Responsibility** (http://www.acm.org/about/code-of-ethics) **and the IEEE Software Engineering Code of Ethics and Professional Practice** (http://www.computer.org/portal/web/certification/resources/code\_of\_ethics) **or the** **ASPRS Code of Ethics** (http://www.asprs.org/About-Us/Code-of-Ethics-of-the-American-Society-for-Photogrammetry-and-Remote-Sensing.html). **List and discuss at least three concepts or characteristics that the codes have in common. State and discuss at least one significant difference between the codes.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

[Core-Tier2]

21. Describe ways in which professionals may contribute to public policy. [Familiarity]

**Question: List and describe at least five organizational, government, or communication channels by which computer science professionals may contribute to the development of public policy. Which channels or approaches are likely to have the greatest impact resulting in public policy change and why? Provide an example of how you might organize a group of computing professionals to alter or retain a public policy or how such a group has already done this effectively.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **AAC&U Rubric 24:** Curiosity | Student explores a topic in depth, yielding a rich awareness and/or little-known information indicating intense interest in the subject. | Student explores a topic in depth, yielding insight and/or information indicating interest in the subject. | Student explores a topic with some evidence of depth, providing occasional insight and/or information indicating mild interest in the subject. | Student explores a topic at a surface level, providing little insight and/or information beyond the very basic facts indicating low interest in the subject. |
|  | 4 | 3 | 2 | 1 |
|  | ☐ | ☐ | ☐ | ☐ |

22. Describe the consequences of inappropriate professional behavior. [Familiarity]

**Question: Even though an inappropriate action might not reach the level of being illegal, describe adverse consequences for yourself, your employer, your profession and/or your family by engaging in inappropriate professional behavior. What are means by which you are able to recognize or identify professional behavior as being inappropriate?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

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| --- | --- | --- | --- | --- |
| **AAC&U Rubric 20:** **Ethical Issue Recognition** | Student can recognize ethical issues when presented in a complex, multilayered (gray) context AND can recognize cross-relationships among the issues. | Student can recognize ethical issues when issues are presented in a complex, multilayered (gray) context OR can grasp cross-relationships among the issues. | Student can recognize basic and obvious ethical issues and grasp (incompletely) the complexities or interrelationships among the issues. | Student can recognize basic and obvious ethical issues but fails to grasp complexity or interrelationships. |
|  | 4 - capstone | 3 - milestone | 2 - milestone | 1 - benchmark |
|  | ☐ | ☐ | ☐ | ☐ |

23. Identify progressive stages in a whistle-blowing incident. [Familiarity]

**Question: Define whistle-blowing and describe the stages through which a whistle-blowing incident might progress from the perspective of the whistleblower.**

**Response:** placeyourresponsehere

Reference(s) (if any):

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| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

24. Investigate forms of harassment and discrimination and avenues of assistance [Usage]

**Question: Name or describe several forms of potential workplace harassment and discrimination. Suggest means or processes for eliminating such treatment of individuals.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

25. Examine various forms of professional credentialing [Usage]

**Question: Describe at least three methods by which computer professionals may become credentialed such that those hiring the services of computer professionals have some indication of the level of their likely abilities? Which of these methods would you most likely pursue yourself and what would motivate you to do so? If you owned a softare development company, which might you depend upon most and under which circumstances in assessing potential employees?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **AAC&U Rubric 26:** Independence | Student educational interests and pursuits exist and flourish outside classroom requirements. Knowledge and/or experiences are pursued independently. | Beyond classroom requirements, student pursues substantial, additional knowledge and/or actively pursues independent educational experiences. | Beyond classroom requirements, student pursues additional knowledge and/or shows interest in pursuing independent educational experiences. | Student begins to look beyond classroom requirements, showing interest in pursuing knowledge independently. |
|  | 4 | 3 | 2 | 1 |
|  | ☐ | ☐ | ☐ | ☐ |

26. Develop a computer usage/acceptable use policy with enforcement measures. [Assessment]

**Question: Find a published computer use policy adopted by a university or a private company, briefly summarize its provisions, and discuss whether its enforcement measures seem reasonable and enforceable.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

27. Describe issues associated with industries’ push to focus on time to market versus enforcing quality professional standards [Familiarity]

**Question: Describe at least three potential negative consequences for a software development company if it focuses too much on shortening time to market for its products over ensuring quality of those products.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

**IV. INTELLECTUAL PROPERTY**

Intellectual property is the foundation of the software industry. The term refers to a range of intangible rights of ownership in an asset such as a software program. Each intellectual property "right" is itself an asset. The law provides different methods for protecting these rights of ownership based on their type. There are essentially four types of intellectual property rights relevant to software: patents, copyrights, trade secrets and trademarks. Each affords a different type of legal protection.

Topics:

[Core-Tier1]

• Philosophical foundations of intellectual property

• Intellectual property rights (cross-reference IM/Information Storage and Retrieval/intellectual property and protection)

• Intangible digital intellectual property (IDIP)

• Legal foundations for intellectual property protection

• Digital rights management

• Copyrights, patents, trade secrets, trademarks

• Plagiarism

[Elective]

• Foundations of the open source movement

• Software piracy

**Learning Outcomes:**

[Core-Tier1]

28. Discuss the philosophical bases of intellectual property. [Familiarity]

**Question: Briefly describe the philosophical justifications for property ownership of from the perspectives of each of the following: Locke’s labor/desert theory, Hagel’s personality theory, utilitarianism, and James Boyle’s more nuanced justification in the law for intellectual property. To what extent are any or all of these reflected in U.S. justifications for property ownership in intellectual works?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

29. Discuss the rationale for the legal protection of intellectual property. [Familiarity]

**Question: What is the stated U.S. constitutional rationale for protecting copyright? What is the legislatively stated justification for patent protection?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

30. Describe legislation aimed at digital copyright infringements. [Familiarity]

**Question: Briefly summarize the core protections afforded by the U.S. Copyright Act. What protections were extended by the U.S. Digital Millennium Copyright Act?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

31. Critique legislation aimed at digital copyright infringements [Assessment]

**Question: How long does copyright last? What are the financial penalties for unwittingly violating the copyright of another? Should be these be either increased or decreased and why?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

32. Identify contemporary examples of intangible digital intellectual property [Familiarity]

**Question: Describe some of the characteristics of intangible digital property that are different from the characteristics of traditional wealth creating forms of property such as land (and other tangible physical resources), labor and capital. Under what circumstances is it beneficial for society to allow products with “public goods” characteristics to be converted to “private goods?” How are these inherent “public goods” characteristics converted so that intangibles such as software and information may generate private wealth?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **AAC&U Rubric 13: Eplanation of Issues** | Issue/problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding. | Issue/problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions. | Issue/problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/or backgrounds unknown. | Issue/problem to be considered critically is stated without clarification or description. |
|  | 4 - capstone | 3 - milestone | 2 - milestone | 1 - benchmark |
|  | ☐ | ☐ | ☐ | ☐ |

33. Justify uses of copyrighted materials. [Assessment]

**Question: What are the factors considered in the “fair use” of copyrighted materials in the U.S.? Present arguments as to why “fair use” should either be expanded or narrowed.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

34. Evaluate the ethical issues inherent in various plagiarism detection mechanisms. [Assessment]

**Question: Should plagiarism detection systems be allowed to copy and store your schoolwork without your permission (i.e. your copyrighted material) in order to detect that someone else in the future has plagiarized it? Why or why not? Should it be standard practice for all commercial and scholarly publishers, newspapers and magazines to always check that their authors have not copied text or images from others? Not plagiarized ideas from others? Why or why not?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

35. Interpret the intent and implementation of software licensing. [Familiarity]

**Question: What is the difference between a license and a contract? Why do most downloads of purchased software from the web require you click agreement to a license? Under what conditions will license provisions be unenforceable against consumers?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

36. Discuss the issues involved in securing software patents. [Familiarity]

**Question: List the arguments for and against the patenting of software. What is the efficacy of obtaining such a patent in the U.S. if most nations of the world do not allow or enforce such patents?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

37. Characterize and contrast the concepts of copyright, patenting and trademarks. [Assessment]

**Question: Briefly summarize the core rights of creators under copyright, patent, and trademark. Briefly summarize the core limits on thos rights. Briefly reflect on the appropriateness of current U.S. law in balancing the extent of rights versus limits for each of these classes of intellectual property.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **AAC&U Rubric 41:** **Existing Knowledge, Research and/or Views** | Student synthesizes in-depth information from relevant sources representing various points of view/approaches. | Student presents in-depth information from relevant sources representing various points of view/approaches. | Student presents information from relevant sources representing limited points of view/approaches. | Student presents information from irrelevant sources representing limited points of view/approaches. |
|  | 4 - capstone | 3 - milestone | 2 - milestone | 1 - benchmark |
|  | ☐ | ☐ | ☐ | ☐ |

[Elective]

38. Identify the goals of the open source movement. [Familiarity]

**Question: What are primary goals of the open source code movement? What are primary goals of the open content movement?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

39. Identify the global nature of software piracy. [Familiarity]

**Question: Explain a few reasons why software piracy is difficult to enforce on a global basis. What are some techniques or infrastructure advancements that are being used to counter or limit software piracy?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

**V. PRIVACY AND CIVIL LIBERTIES**

Electronic information sharing highlights the need to balance privacy protections with information access. The ease of digital access to many types of data makes privacy rights and civil liberties more complex, differing among the variety of cultures worldwide.

Topics:

[Core-Tier1]

• Philosophical foundations of privacy rights (cross-reference IS/Fundamental Issues/philosophical issues)

• Legal foundations of privacy protection

• Privacy implications of widespread data collection for transactional databases, data warehouses, surveillance systems, and cloud computing (cross reference IM/Database Systems/data independence; IM/Data Mining/data cleaning)

• Ramifications of differential privacy

• Technology-based solutions for privacy protection (cross-reference IAS/Fundamental Concepts/data protection laws)

[Elective]

• Privacy legislation in areas of practice

• Civil liberties and cultural differences

• Freedom of expression and its limitations

**Learning Outcomes:**

[Core-Tier1]

40. Discuss the philosophical basis for the legal protection of personal privacy. [Familiarity]

**Question: What benefits does society gain by protecting the privacy of individual humans?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

41. Evaluate solutions to privacy threats in transactional databases and data warehouses. [Assessment]

**Question: If a hacker thief manages to surreptitiously place keystroke tracking software on your laptop, gains your username and password for accessing your personal online banking account and then electronically transfers your bank account funds to an account in a bank in Russia, does your bank suffer the monetary loss or do you suffer the monetary loss under U.S. law? How are you technologically, organizationally and legally protected from loss, if at all, under this situation?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

42. Recognize the fundamental role of data collection in the implementation of pervasive surveillance systems (e.g., RFID, face recognition, toll collection, mobile computing). [Familiarity]

**Question: To what extent is the commercial sector allowed to gather, store, exchange, and sell detailed information about your location and movements gathered from your phone, vehicle, and Internet activities without your explicit knowledge? What are their limits in merging this data with other personal information gathered about you from all other businesses with which you interact? If the balance is not currently optimal, what might be a better balance between the rights of and limits on the commercial sector in using information about individuals and how might a more appropriate balance be achieved?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **AAC&U Rubric 41:** **Existing Knowledge, Research and/or Views** | Student synthesizes in-depth information from relevant sources representing various points of view/approaches. | Student presents in-depth information from relevant sources representing various points of view/approaches. | Student presents information from relevant sources representing limited points of view/approaches. | Student presents information from irrelevant sources representing limited points of view/approaches. |
|  | 4 - capstone | 3 - milestone | 2 - milestone | 1 - benchmark |
|  | ☐ | ☐ | ☐ | ☐ |

43. Recognize the ramifications of differential privacy. [Familiarity]

**Question: Define differential privacy. Discuss how identities in a large anonymized statistical database provided by the US Census Bureau might be compromised when combined or compared with other databases.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

44. Investigate the impact of technological solutions to privacy problems. [Usage]

**Question: Describe at least three technological solutions to prevent surreptitious skimming of information on RFID tags that you might be attached to your clothing, in your wallet or attached to objects you carry. What are the benefits of each approach? What are the limits or problems with each approach?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

 [Elective]

45. Critique the intent, potential value and implementation of various forms of privacy legislation. [Assessment]

**Question: Assume that a law is passed that allows each U.S. resident to claim ownership in certain classes of personal information about yourself. What would be the value of the approach? Who would gain and who would lose? How could such ownership rights in personal information be supported technologically?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

46. Identify strategies to enable appropriate freedom of expression. [Familiarity]

**Question: If the U.S. Congress was to pass federal legislation stating that *one may not link another person’s identity to an RFID tag without first obtaining that person’s explicit permission*, such legislation would be held to violate free speech rights under the findings of the current US Supreme Court. Explain whose rights would be violated and explain the reasoning of the court.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

**VI. PROFESSIONAL COMMUNICATION**

Professional communication conveys technical information to various audiences who may have very different goals and needs for that information. Effective professional communication of technical information is rarely an inherited gift, but rather needs to be taught in context throughout the undergraduate curriculum.

Topics:

[Core-Tier1]

• Reading, understanding and summarizing technical material, including source code and documentation

• Writing effective technical documentation and materials

• Dynamics of oral, written, and electronic team and group communication (cross-reference HCI/Collaboration and Communication/group communication; SE/Project Management/team participation)

• Communicating professionally with stakeholders

• Utilizing collaboration tools (cross-reference HCI/ Collaboration and Communication/online communities; IS/Agents/collaborative agents)

[Elective]

• Dealing with cross-cultural environments (cross-reference HCI/User-Centered Design and Testing/cross-cultural evaluation)

• Tradeoffs of competing

**Learning Outcomes:**

 [Core-Tier1]

47. Evaluate written technical documentation to detect problems of various kinds. [Assessment]

**Question: Read the standard Licensed Application End User License Agreement (EULA) used by Apple found at https://www.apple.com/legal/internet-services/itunes/appstore/dev/stdeula/. Discuss the extent to which you as an applications developer would be liable as compared to Apple for an application developed by you but distributed through and sold by Apple. How might you more securely minimize your own liability exposure?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

48. Plan interactions (e.g. virtual, face-to-face, shared documents) with others in which they are able to get their point across, and are also able to listen carefully and appreciate the points of others, even when they disagree, and are able to convey to others that they have heard. [Usage]

**Question: What are benefits of the Module assignment and class discussion process as used for both on-campus and distance students in COS 490? What are drawbacks? Suggest means by which you and others could gain greater value from the class experience by altering the class preparation and discussion methods used.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

49. Describe the strengths and weaknesses of various forms of communication (e.g. virtual, face-to-face, shared documents) [Familiarity]

**Question: Describe three current methods or environments for working with others in preparing a common shared document. What are the benefits and drawbacks of using each such sharing method or environment?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

50. Examine appropriate measures used to communicate with stakeholders involved in a project. [Usage]

**Question: Assume that you are part of a team developing an online teaching evaluation system that will replace the current paper evaluation processes and will be used by all students to evaluate instructors, teaching assistants and academic advisors at the University of Maine. Who are the stakeholders with whom your team should communicate, what are the issues appropriate to address with each stakeholder, and how would you communicate with the stakeholders?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

51. Compare and contrast various collaboration tools. [Assessment]

**Question: Select three different implementations of open source groupware or project collaboration software from the list at http://en.wikipedia.org/wiki/List\_of\_collaborative\_software. List the capabilities provided through an implementation of each program and assess the benefits and drawbacks in the context of your future use of each program.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

52. Examine the tradeoffs and common sources of risk in software projects regarding technology, structure/process, quality, people, market and financial. [Usage]

**Question: Briefly list and describe at least five common sources of risk that may impinge on your ability to adequately and appropriately implement a software project. Explain actions you or your company might take to lessen each identified risk.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **AAC&U Rubric 13: Explanation of issues** | Issue/problem to be considered critically is stated clearly and described comprehensively by student, delivering all relevant information necessary for full understanding. | Issue/problem to be considered critically is stated, described, and clarified by student so that understanding is not seriously impeded by omissions. | Issue/problem to be considered critically is stated by student but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/or backgrounds unknown. | Issue/problem to be considered critically is stated by student without clarification or description. |
|  | 4 - capstone | 3 - milestone | 2 - milestone | 1 - benchmark |
|  | ☐ | ☐ | ☐ | ☐ |

53. Evaluate personal strengths and weaknesses to work remotely as part of a multinational team. [Assessment]

**Question: What skills, capabilities and personal qualities should a person have in order to work remotely as part of a multinational information system development team? How would you go about addressing weaknesses in your own background or capabilities to better enable you to function on such a team?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

**VII. HISTORY**

This history of computing is taught to provide a sense of how the rapid change in computing 356 impacts society on a global scale. It is often taught in context with foundational concepts, such as 357 system fundamentals and software developmental fundamentals.

Topics:

[Elective]

• Prehistory—the world before 1946

• History of computer hardware, software, networking (cross-reference AR/Digital logic and digital systems/history of computer architecture)

• Pioneers of computing

• History of Internet

**Learning Outcomes:**

54. Identify significant continuing trends in the history of the computing field. [Familiarity]

**Question: Identify and describe at least three significant trends in the history of the computing field, speculate as to the longevity of each trend, and explain why the trend is likely to become of lesser or greater importance over the next decade.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

55. Identify the contributions of several pioneers in the computing field. [Familiarity]

**Question: Identify at least three pioneers in the computing field and briefly describe their most significant contributions.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

56. Discuss the historical context for several programming language paradigms. [Familiarity]

**Question: Describe the core characteristics of imperative, declarative, functional, object-oriented, logic and symbolic programing language paradigms. Briefly describe the historical progression and development of the various paradigms.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

57. Compare daily life before and after the advent of personal computers and the Internet. [Assessment]

**Question: Compare your daily student life now with that of a university student just before the emergence of the Internet, email and the personal computer. What tools would you have used for accomplishing computations? What tools would you have used for communications? What learning resources would you have used in your courses? What skills might the average student have had in the past that the average student is now lacking? What skills might the average student today have that the average student then would have lacked?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

**VIII. ECONOMIES OF COMPUTING**

Economics of computing encompasses the metrics and best practices for personnel and financial management surrounding computer information systems. Cost benefit analysis is covered in the Information Assurance and Security Knowledge Area under Risk Management.

Topics:

• Monopolies and their economic implications

• Effect of skilled labor supply and demand on the quality of computing products

• Pricing strategies in the computing domain

• The phenomenon of outsourcing and off-shoring software development; impacts on employment and on economics

• Consequences of globalization for the computer science profession

• Differences in access to computing resources and the possible effects thereof

• Costing out jobs with considerations on manufacturing, hardware, software, and engineering implications

• Cost estimates versus actual costs in relation to total costs

• Entrepreneurship: prospects and pitfalls

• Use of engineering economics in dealing with finances

**Learning Outcomes:**

58. Summarize the rationale for antimonopoly efforts. [Familiarity]

**Question: List and discuss at least five adverse effects of monopolistic practices by dominant firms.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

59. Identify several ways in which the information technology industry is affected by shortages in the labor supply. [Familiarity]

**Question: According to the corporate sector, there is currently a severe shortage of computer science graduates. List and discuss at least three adverse ramifications caused by this shortage. List at least three groups that may benefit from this shortage and explain why.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

60. Identify the evolution of pricing strategies for computing goods and services. [Familiarity]

**Question: List at least three market segmentation strategies for pricing computing goods and services and list the names of example products or firms that have utilized each of these strategies. List at least three alternative means of generating revenues from digital goods or services other than selling copies of the good.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **AAC&U Rubric 41:** **Existing Knowledge, Research and/or Views** | Student synthesizes in-depth information from relevant sources representing various points of view/approaches. | Student presents in-depth information from relevant sources representing various points of view/approaches. | Student presents information from relevant sources representing limited points of view/approaches. | Student presents information from irrelevant sources representing limited points of view/approaches. |
|  | 4 - capstone | 3 - milestone | 2 - milestone | 1 - benchmark |
|  | ☐ | ☐ | ☐ | ☐ |

61. Discuss the benefits, the drawbacks and the implications of off-shoring and outsourcing. [Familiarity]

**Question: Define off-shoring versus outsourcing for development of computer code. Discuss the potential benefits and drawbacks of each.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

62. Investigate and defend ways to address limitations on access to computing. [Usage]

**Question: List and discuss at least three reasons why one might want to limit access to the use of computers by children. What are the methods by which such limitations might be imposed.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

**IX. SECURITY POLICIES, LAWS AND COMPUTER CRIMES**

While security policies, laws and computer crimes are important, it is essential they are viewed with the foundation of other Social and Professional knowledge units, such as Intellectual Property, Privacy and Civil Liberties, Social Context, and Professional Ethics. Computers and the Internet, perhaps more than any other technology, have transformed society over the past 50 years. At the same time, they have contributed to unprecedented threats to privacy; whole new categories of crime and anti-social behavior; major disruptions to organizations; and the large-scale concentration of risk into information systems.

Topics:

• Examples of computer crimes and legal redress for computer criminals (cross-reference IAS/Digital Forensics/rules of evidence)

• Social engineering, identity theft and recovery (cross-reference HCI/Human Factors and Security/trust, privacy and deception)

• Issues surrounding the misuse of access and breaches in security

• Motivations and ramifications of cyber terrorism and criminal hacking, “cracking”

• Effects of malware, such as viruses, worms and Trojan horses

• Crime prevention strategies

• Security policies (cross-reference IAS/Security Policy and Governance/security policies)

**Learning Outcomes:**

63. List classic examples of computer crimes and social engineering incidents with societal impact. [Familiarity]

**Question: List at least five types of computer crimes, describe each crime, and provide a specific example of each. Describe which individuals and which segments of society are most harmed by each crime.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **AAC&U Rubric 41:** **Existing Knowledge, Research and/or Views** | Student synthesizes in-depth information from relevant sources representing various points of view/approaches. | Student presents in-depth information from relevant sources representing various points of view/approaches. | Student presents information from relevant sources representing limited points of view/approaches. | Student presents information from irrelevant sources representing limited points of view/approaches. |
|  | 4 - capstone | 3 - milestone | 2 - milestone | 1 - benchmark |
|  | ☐ | ☐ | ☐ | ☐ |

64. Identify laws that apply to computer crimes [Familiarity]

**Question: What offenses are specified in the U.S. Computer Fraud and Abuse Act? What are the potential penalties for each offense?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

65. Describe the motivation and ramifications of cyber terrorism and criminal hacking [Familiarity]

**Question: List at least five probable motivations of cyber terrorism. List at least five probable motivations of cracking. What are the actual or potential ramifications for you personally as a result of such activities by others?**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **AAC&U Rubric 17: Conclusions and related outcomes (implications and consequences)**  | Student explores a topic in depth, yielding a rich awareness and/or little-known information indicating intense interest in the subject. | Student explores a topic in depth, yielding insight and/or information indicating interest in the subject. | Student explores a topic with some evidence of depth, providing occasional insight and/or information indicating mild interest in the subject. | Student explores a topic at a surface level, providing little insight and/or information beyond the very basic facts indicating low interest in the subject. |
|  | 4 - capstone | 3 - milestone | 2 - milestone | 1 - benchmark |
|  | ☐ | ☐ | ☐ | ☐ |

66. Examine the ethical and legal issues surrounding the misuse of access and various breaches in security [Usage]

**Question: Explain why seeking out and uncovering breaches in security have sometimes been justified by hackers as morally responsible actions. List at least three potential negative actions that might be imposed by your employing organization if you misuse or abuse computer system administrative privileges.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

67. Discuss the professional's role in security and the trade-offs involved. [Familiarity]

**Question: As a computer science professional, list and explain at least five actions you would recommend for protecting the security of the computer systems of your employer.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

68. Investigate measures that can be taken by both individuals and organizations including governments to prevent or mitigate the undesirable effects of computer crimes and identity theft [Usage]

**Question: List and explain at least three measures an organization might take to prevent or mitigate the undesirable effects of computer crimes. List and explain at least three measures an individual might take to prevent identity theft.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |

69. Write a company-wide security policy, which includes procedures for managing passwords and employee monitoring. [Usage]

**Question: Find on the web an example of a company-wide security policy. Suggest enhancements in the wording or substitute improved wording for managing passwords and monitoring the activities of employees.**

**Response:** placeyourresponsehere

Reference(s) (if any):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment:**  | Does Not Meet Expectations | Almost Meets Expectations | Meets Expectations | Exceeds Expectations |
|  | ☐ | ☐ | ☐ | ☐ |