A. Department goals and objectives are linked to the university and college mission and strategic priorities, and to their strategy for improving their position within the discipline. (1 page maximum)

1. What is the department’s mission and is it clearly aligned with the university and college mission and direction?

The department strives to offer quality undergraduate and graduate courses / programs; places a high priority on quality research and effective teaching; seeks to attract highly-qualified students; and strives to attract and nurture high-caliber faculty. This mission is consistent with university goals of ensuring student success, enhancing academic excellence, expanding breakthrough research, and developing / recognizing our people.

2. How does the department’s mission relate to curriculum; enrollments; faculty teaching; research/professional/creative activity and outreach? Is it aligned with the college’s strategic priorities?

The departmental mission aligns with university and college strategic priorities, although the department is now in financial jeopardy under KSU’s new RCM budget model due to developmental growth in faculty numbers under state direction to grow a doctoral program.

3. How does the department contribute to university-wide curricular needs through general education and service instruction?

The department was limited to a single Liberal Education Course (CS 10051 Introduction to Computer Science), but may have an opportunity to offer more courses under the new Kent Core curriculum. However, unlike many universities, KSU does not have a university-wide computing requirement, and does not have a large number of engineering majors taking CS courses.

4. How does the department promote diversity?

The department has an active NSF S-STEM grant for broadening participation, and a diverse set of faculty, two of whom are women, and outreach activities to women and other minority students in computing.

5. What is the current standing of the department’s programs within the discipline? What goals does the program have in terms of its standing within the University, region, state or nation? (To establish benchmarks, you may wish to use information from the discipline’s professional organizations, national rankings, accreditation standards, other comparable programs.)

The National Academies have not updated their rankings of Computer Science programs since 1985. At that time, KSU’s Computer Science doctoral program was just beginning, and the program was housed within the Mathematical Sciences Department. The next ranking was initiated in late 2007 but so far has not been released.
B. Curriculum is relevant, rigorous, current and coherent. (4 pages maximum)

(Check appendices listing for data that needs to be included)

1. How does the department determine curricular content? How does the curriculum relate to current existing standards, if any, of the discipline?

The department determines its core undergraduate curriculum based upon the latest recommendations of the primary Computer Science professional societies: ACM (Association of Computing Machinery) and IEEE (Institute of Electrical and Electronics Engineers). The curriculum outline from these bodies changes every four/five years, but the Computer Science field and market demand changes even faster. To keep up with these changes, instructors also introduce ‘selected topics courses’ in fields that are currently needed in the job market, and many of these courses become regular catalog courses once the market need and student demand is proven.

The graduate program requires students to expand their broad knowledge in at least three different areas of computer science. Each area consists of at least one standard course in the area plus several selected topics courses based on research faculty interests. The depth is provided through identifying a concentration area that focuses in one particular subject area and by taking graduate courses, research hours and writing a thesis/dissertation in that area. For the Master’s with non-thesis option, students take advanced graduate courses or selected topic courses related to their concentration area followed by an applied industrial project.

2. What internal or external measures of review are employed to ensure that the curriculum is relevant and up-to-date? When were these measures last employed for this curriculum?

We have internal measures and external measures in place for both undergraduate and graduate programs. All four graduate degree programs (MA, MS thesis option, MS non-thesis option and PhD) follow these measures. Internal measures include: evaluation of newly-proposed courses by the departmental curriculum committee; student evaluation of courses and their preparation in Computer Science; an exit survey of graduating students; a plan of study for graduate degree programs / university-wide GPS (Graduation Planning System) for undergraduates; and yearly self-analysis of student evaluation forms by the department under the university AQIP (Academic Quality Improvement Project) program. The external measures for the core and required courses follow the ACM and IEEE guidelines, results of polls from local industries about the fields that are needed, and surveys of alumni. Except for the GPS, all the measures were established in the year 2004 or before, while the GPS was established in 2008. However, a detailed departmental equivalent of the GPS based upon course dependencies has been in place since 1992.

The curriculum committee is composed of tenure track faculty including many senior professors. This committee evaluates the merit of proposed courses before faculty members can teach them, with the courses evaluated on the basis of content and market need (as well as current research areas in the case of graduate courses). Student evaluation of a course is a standard university procedure. The departmental curriculum committee regularly undertakes a self-analysis based upon comments in the student
evaluation forms, and prepares a report for the university about the issues and the measures that have been taken to correct and improve the program.

We also give an exit survey to every graduating student to survey their preparedness in their chosen field, the interaction they had with their instructors and the quality of overall instruction. The entire undergraduate and graduate curriculum is reviewed by external reviewers every five years.

3. Are the curricular offerings structured in a logical, sequential and coherent manner? Is there an appropriate balance between depth and breadth? Does the sequence build from simple to complex? Are basic threads woven throughout?

The department has created detailed descriptions of the logical structure, sequence and coherency for the courses at the undergraduate level as well as the graduate level. In the undergraduate curriculum we have multiple layers of courses: introductory foundational courses (CS 10051 Introduction to Computer Science, CS 10061 Introduction to Computer Programming, CS 23021 Computer Science I Programming and Problem Solving), core foundational courses (CS 33001 Computer Science II Data Structure and Abstractions, CS 35101 Computer Architecture and CS 33211 Operating Systems), upper division required courses, elective courses, and selected topics courses. There is a detailed dependency chart for the courses, first created in 1992, that is continuously updated on a yearly basis by the departmental curriculum committee. This dependency chart is based upon a progression from simple to complex courses. Beginning in 2008, KSU initiated a university wide GPS (Graduation Planning System) Roadmap that does something similar, guiding students through their courses in different semesters based upon the dependency chart. Further, the GPS guides students to graduate in four years, even if they have some backlog in courses compared to the ideal progression.

Introductory foundational courses have coordinators whose task is to provide synchronization at different levels: between the sections and between the lectures and laboratory sessions. These coordinators synchronize the material on a weekly basis.

The graduate course offerings are structured in several coherent research clusters, according to the research interest/activity of the faculty. Students expand their breadth knowledge by taking courses from at least three diverse clusters, and concentrate on depth by taking several research and selected topics in their area of concentration.

4. If consistent with the program mission, does the curriculum adequately prepare students for further study or employment?

Our undergraduate program has both BS and BS/MS degrees, and our graduate program has four different types of degrees - MA, MS with thesis option, MS with non-thesis option, and PhD. Each degree has a different focus.

The BS degree prepares students both for the workforce as well as Masters study. In addition to required coursework, we also have an optional internship program (CS 33192 Internship in Computer Science) in which students do practical training in industrial settings to prepare them for the transition to industry. The BS/MS program prepares students who want to go for further study in a shorter period. Under this
program, students are allowed to take graduate level courses in their senior years so that they can finish their MS degree faster.

The graduate program prepares students for multiple career goals. Students who plan non-academic careers or want to enhance their skills beyond the BS level can earn a Master's degree with a non-thesis option. Students who seek positions in research and development (R&D) or plan to proceed into the PhD program can earn a Master’s degree with the thesis option. Students who plan to become professional scholars, college and university teachers, or independent research workers in private, industrial or government research institutions can earn a PhD degree.

5. **What do graduates of the program say about their preparation?**

Our alumni statistics clearly show that our BS and BS/MS graduates are well-placed in the information technology industry. The graduates of our MA, MS and PhD programs are also well-placed in information technology industries, national research laboratories, corporate research centers, and as college and university faculty members. Our graduate students often publish in international conferences or journals before taking up an employment.

We survey our alumni through questionnaires and more recently at an alumni reunion. Our alumni survey results have been quite positive. Through the exit survey we conducted during the past four years, those who responded expressed their satisfaction with their experiences at Kent. Some made some positive comments about course offerings, seminars, and the colloquium series. Approximately 43% graduates strongly agree that their Kent State education prepared them well, and another 50% agree that their Kent State education prepared them well. A recently-graduated student, who is currently an assistant professor in another institution wrote, "The graduate program at KSU improves students' research capabilities and problem solving skills. The courses offered by the program enrich students' experience and prepare them for undertaking a wide range of problems in an efficient manner." Another alumnus wrote, “My courses served me well in giving me content knowledge and applicable skills. Significantly, my courses, research experiences, and dissertation writing gave me exactly the grounding I needed to be effective both as a teacher for undergraduate computer science and a mentor for undergraduate research.” Yet another alumnus wrote, “The time, effort, education standard, and support have taught me things that I would never have achieved if I had gone somewhere else.” Dr. Liao wrote, “The computer science program at Kent State University prepares me with fundamental knowledge in computer science so that I could adjust myself in this ever-changing computing area. It also offers me a series of seminars and all graduate students get chance to give research talks. Moreover, the opportunity to be a teaching assistant and/or instructor has been very helpful for my career as a faculty member." Dr. Oleg Komogortsev wrote, “The program prepared me to conduct independent research, establish and run a successful research laboratory. The program allowed to develop and hone writing and oral presentational skills necessary for a successful academic career.

6. **What do employers of program graduates say about their preparation?**
Generally, we have a very high rate of placement for graduates of our BS, BS/MS, MS and PhD programs. Many employers of our BS graduates have hired more than one of our graduates. Most of our students receive job offers before they graduate. In one instance, the employer of a recent graduate wrote, “I am very pleased with his performance in and out of classrooms. In general I found him dedicated, knowledgeable, sincere, and personable.”

7. What are the educational, professional, career, and/or life goals of the students who choose to major in this program?

Computer Science students have a wide-variety of goals and career plans. BS graduates chose information technology industries, self-employment, and higher studies as their goals/professions. MS graduates chose industrial employment, self-employment, corporate research centers, and PhD study. PhD graduates preferred teaching and academics, corporate research centers, and national research laboratories.

8. In what ways does the program contribute to the education of students in terms of general knowledge, critical thinking capacity and other essential cognitive skills?

Kent State University places significant emphasis on students interfacing with other disciplines outside their major, such as physical sciences, logic and mathematics, media and communications, and social studies, and on the study of a foreign language and being exposed to cultural diversity. Our BS students complete 121 credit hours, including 36 credit hours of liberal education, 15 credit hours of mathematics, and 70 credit hours of Computer Science.

Liberal education courses provide general knowledge. The required mathematics courses are two calculus courses and a linear algebra course and are necessary for modeling and problem solving.

Critical thinking and essential cognitive skills are part of the Computer Science program, both at undergraduate level and graduate level, through course projects and labs. Most of the elective courses at the undergraduate level and almost all graduate-level courses have at least one individual or team project, in which students select a challenging project, perform a literature search, formulate a solution, and implement the solution. In addition, at the undergraduate level we have a Capstone Project course in which students undertake a realistic, industrial-level, team project.
C. Faculty quality and productivity

(1 page maximum)

(Check appendices listing for data that needs to be included)

1. Do faculty possess the appropriate background experience and credentials?

All faculty members have a PhD in Computer Science or a related area. Some have industrial experience, and many are recognized as ACM and IEEE senior members or fellows. Faculty research was supported by NSF, DARPA, NASA, CISCO, OBR, etc.

2. Are faculty current in relation to the knowledge base and content of the discipline and curricular offerings? What professional development activities have faculty participated in over the past three years?

Our curriculum is updated regularly as we introduce new courses to reflect current topics in this fast-changing discipline. Our faculty publish in journals and conferences, and present regularly at national and international conferences. They visit companies and academic institutions to expand their knowledge and establish research cooperation.

3. Are the program expectations for faculty involvement in the scholarships of discovery, application, integration and teaching, and public service/academic outreach activities appropriate; and how are these expectations met? Are these expectations consistent with university and college policies regarding teaching assignments, faculty excellence allocations, and other aspects of faculty roles and rewards? (See appendix for vita instructions)

In addition to tenure and promotion evaluations, faculty are evaluated every 5 years for graduate faculty status and for merit based on research, teaching and service. Our expectations are consistent with university and college policies. Over the last 5 years, our faculty published 4 books, 6 book chapters, 66 journal and over 280 refereed conference articles. They gave over 130 conference presentations and 30 invited/colloquium talks. 19 PhD dissertations and 87 MS theses were successfully defended. 102 proposals were submitted to funding agencies and 24 were funded, bringing in about 5.4M dollars.

4. In what way is faculty professional development and growth fostered?

All pre-tenure tenure-track-faculty have received one course release per year, as has each faculty member with grant funding. After seven years, each faculty is usually granted a sabbatical. The department funded faculty travel to over 130 conferences/workshops during this time period.

5. In what ways do the department faculty lend their professional expertise to off-campus constituencies?

Many faculty are involved in reviewing papers for CS journals and conferences, serving in professional societies and on program committees (as chairs/members) of conferences, serving as panelists in NSF panels, consulting local industries, etc.
D. Administrative quality and support (1 page maximum).

(Check appendices listing for data that needs to be included)

1. What is the effectiveness of department/program leadership? (department chair, director, coordinator, lead faculty, etc.)

The current Department Chair has served since 2005, first for one year as Interim Chair, and now in the fourth year of a four year term. He was reviewed during the Spring 2009 semester, and the departmental review committee recommended him for reappointment. The Dean has since announced his intention to reappoint him for another term. The department has 5 additional rotating administrative positions — Assistant Chair, Graduate Coordinator, Curriculum Coordinator, and System Coordinator — and the faculty assigned to those positions are generally effective in their roles.

2. Is the current leadership model appropriate for the type of program?

The roles and duties of the departmental administrative Coordinators, along with their appropriate committees, were reviewed recently during the 2008 departmental Handbook revision. Minor changes were made, but in general the department was satisfied with that model. At that time, the faculty also reaffirmed their desire to have a Faculty Advisory Committee (FAC) comprised of the entire faculty, rather than elected representatives.

3. How effective is administrative leadership (chair, dean, assistant/associate dean) in supporting the program?

The past five years have been a period of transition for much of the university. A new President was hired in 2006, and a new Provost was hired the following year. After the retirement of the Dean of Arts and Sciences in 2004, one Interim Dean led the college the following year, and another led for the next three years, with a permanent Dean hired only in 2008. In Research and Graduate Studies, the VP Research and Dean of Graduate Studies was away for a year, and that position was later divided, with several Interim Deans selected to lead Graduate Studies. These many transitions have often resulted in policy shifts and mixed messages.

4. Does the administrative leadership provide for and participate in goal setting, decision-making and resource allotment to build and sustain the program?

The Department Chair has regular meetings of faculty and staff once per month, and usually schedules a one-day onsite “retreat” each year to consider an issue in depth. Major shifts in undergraduate and graduate policy are proposed by the department’s very active Curriculum and Graduate Studies Committees, which typically meet 1-2 times per month, and bring those proposals to the faculty and Chair for approval. Most faculty participate in this democratic process of governance.
E. Teaching/learning environments that facilitate student success. (4 pages maximum) (Check appendices listing for data that needs to be included)

1. What is the program looking for in its students? What kind of students is the program well suited to serve? How does the program define “quality” in terms of admission to the program (when relevant)?

The Computer Science Department at Kent State University is looking for well-motivated, smart individuals, who are willing to learn. The Computer Science program is for those individuals who love to solve puzzles, invent new ways of using computers, or exchange theories about new ideas; who enjoy finding better ways to get things done using computers, are interested in understanding how computers work and how they can make businesses work better and more securely; who want to be involved in building the next generation of computers, software tools, networks, mobile communications, mobile phones, tiny media players, and even high-tech clothing, or creating new and more advanced medical tools; and those who enjoy being a part of the evolution of technology in this fast-paced, ever-changing discipline.

The Computer Science Department has approximately 100 graduate students and approximately 250 undergraduate students. The department covers nearly every aspect of computer science, including: database systems, data mining, distributed systems, parallel processing, interconnection networks, graphics, scientific visualization, image processing, software engineering, algorithms and computational theory, computational intelligence, communication networks, wireless and sensor networks, and multimedia networking, web-based applications, symbolic computation, multimedia languages, information security, and network security.

Kent State University’s freshman admission policy differentiates among students with varying degrees of preparation for college studies. The students most likely to be admitted and succeed are those who have graduated with at least 16 units of the recommended college preparatory curriculum in high school, who have achieved a cumulative high school grade point average of 2.5 or higher (on a 4.0 scale), and whose composite ACT score is 21 or better (980 combined critical reading + math SAT score). High school computer science and mathematics classes are the gateway to studying Computer Science at Kent State University.

Students entering our CS Master's program are generally expected to have a Bachelor's degree in computer science or a related discipline, with a grade point average of 3.0 out of 4.0. The GRE is not required but recommended for admission and used as one of the criteria for financial aid consideration. A minimum TOEFL score of 527 (paper base), 197 (computer base), or 71 (IBT) is required for International applicants.

We expect applicants to our graduate program to have mathematical proficiency through Linear Algebra and Discrete Mathematics, and to have taken computer science course work that minimally includes Data Structures, Structure of Programming Languages, Operating Systems, and Computer Architecture.

2. To what extent does the program have articulated learning outcomes (content and skills) for students? By what means are these outcomes measured? (Assessment activities may include surveys, reports from internship or cooperative education
supervisors, student evaluations of instruction or other aspects of the program,
focus groups, the review of capstone courses or portfolios of student work, results on
standardized tests, licensure and certification examination pass rates, accreditation
results, etc.) Do most students achieve them?

The Department of Computer Science at Kent State University offers courses and
curriculum leading to the Bachelor of Science degree in Computer Science. This program
meets the needs of both the students wishing to pursue a career immediately upon
graduation and those students planning for graduate studies in computer science. The
curriculum is aligned with the most recent ACM/IEEE-CS curriculum guidelines and as
such offers a good balance of practical skills and the underlying knowledge necessary for
adapting to the ever- and often-changing needs of technology.

The Bachelor of Science Program in Computer Science at Kent State University is
designed to instill in the student a system-level perspective that transcends the
implementation details of individual software components, an appreciation of the
structure of such software systems, and an understanding of the processes involved in
their construction.

Graduates of the program understand not only the theoretical underpinnings of the
discipline but also how that theory influences and is applied in practice. The program
emphasizes the key themes of abstraction, complexity, and evolutionary change as
applied to the development and analysis of software. The program provides a solid
foundation that allows the students to maintain their skills in the rapidly evolving field.
Students of the Computer Science program develop a wide range of capabilities and
skills. Here is a list of cognitive capacities and skills relating to Computer Science that
represent the learning objectives of the program: (a) Knowledge and understanding:
demonstrate knowledge and understanding of essential facts, concepts, principles, and
theories relating to Computer Science and software applications; (b) Modeling: use such
knowledge and understanding in the modeling and design of computer-based systems in a
way that demonstrates comprehension of the tradeoffs involved in design choices; (c)
Requirements: identify and analyze criteria and specifications appropriate to specific
problems, and plan strategies for their solution; (d) Critical evaluation and testing:
analyze the extent to which a computer-based system meets the criteria defined for its
current use and future development; (e) Methods and tools: deploy appropriate theory,
practices, and tools for the specification, design, implementation, and evaluation of
computer-based systems; (f) Professional responsibility: recognize and be guided by the
social, professional, and ethical issues involved in the use of computer technology; (g)
Communication: make succinct presentations about technical problems and their
solutions; (h) Teamwork: be able to work effectively as a member of a software
development team.

The CS graduate program is designed to provide prospective and current graduate
students with an educational and research environment that fosters personal and
intellectual growth, and allows them to accomplish their academic goals and develop a
career path.

The program offers four graduate degree programs. (1) The Combined
Baccalaureate and Master's degree program is a fast-track to graduate education. It is
designed for students without prior undergraduate degrees in computer science. (2) The
Master of Science degree program has two concentration tracks: a non-thesis Master's degree program that supports the needs of persons seeking graduate education for entry into non-academic careers or to enhance and expand their career options; a thesis Master's degree program that fosters close collaboration between research and academic needs and is designed for students who seek academic careers or positions in research and development (R&D). While the latter requires writing a thesis, the former does not require writing a thesis, but the student is required to complete a project and take an oral examination. (3) The Master of Arts degree program provides students with the technical knowledge and skills necessary for success within the information and high technology industries. The program emphasizes breadth of knowledge in advanced computer science topics to augment the student's baccalaureate degree. (4) The PhD degree program promotes research, discovery and integration. It is designed for students interested in becoming professional scholars, college and university teachers, or independent research workers in private, industrial or government research institutions.

We use a number of assessment activities to measure learning outcomes, including:

a. CS II Exit survey, CS Field Test results;
b. Capstone projects, honor thesis for undergraduates;
c. Internship (47 undergraduate students had internship over the past five years);
d. Student Grades;
e. Student evaluations of courses and instructors;
f. Thesis, research projects and OPTs (Optional Professional Training) for master’s students;
g. Publications, presentations at conferences, awards for graduate students; etc. (See appendix for a representative listing of student publications, a representative listing of student presentations, and a representative listing of externally awarded student prizes and awards over the past five years).

Most of our students achieve the required skills. Our recent BS, MS and PhD graduates easily find jobs.

3. How are program expectations communicated to students? Are students kept informed of their progress in meeting intended program outcomes?

The program expectations are extensively described on our websites:

- [http://www.kent.edu/CAS/CS/undergraduate/index.cfm](http://www.kent.edu/CAS/CS/undergraduate/index.cfm)
- [http://www.kent.edu/CAS/CS/graduate/index.cfm](http://www.kent.edu/CAS/CS/graduate/index.cfm)

The CS II Exit survey has indicated that students use and visit our web site regularly. They are informed about the program and which course(s) they should take next. At the beginning of each semester, our Graduate Coordinator meets with graduate students in our Masters/Doctoral seminar to discuss expectations and to keep students informed. An academic advisor is assigned to each graduate student during the first week of the semester. Later in the program, a research advisor is chosen by a graduate student. At the undergraduate level, there are 4 tenure track faculty advisors available to assist students. Honors students who write a thesis also select a research advisor to guide them. All of our core undergraduate courses have a faculty coordinator. All of our undergraduate/graduate courses have syllabi available on-line and course web-pages maintained by the instructor. Many faculty post their lecture on those web-pages. The
results of all tests, exams, and homework and project assignments are conveyed in a timely manner to students, and they are kept informed of their progress in meeting intended program outcomes.

4. **How is assessment of student learning outcomes used in reviewing and modifying program curriculum, advising, and other program elements, and in evaluating faculty?**

Our curriculum is modified, enhanced and updated regularly as we introduce new courses to reflect current topics in this fast changing discipline. Every year the CS I Entry survey, CS II Entry survey, CS II Exit survey, and CS Field Test results, are used in reviewing and modifying our curriculum. The last review of undergraduate core courses was done in Spring 2009 by a subcommittee of the Curriculum Committee. *CS 10051 Introduction to Computer Science* was recently substantially revised to attract more CS Majors, and to synchronize its lecture and lab components. We recently increased the number of tutors for lower-level classes. These new concentrations were developed: Web Design, Game Programming, and Information Security. We take student evaluations into account when evaluating faculty teaching for merit.

5. **In what ways does the program evaluate student success following graduation and the program’s contribution to that success?**

We evaluate student success following graduation and the program’s contribution to that success by getting feedback from alumni and their employers, by keeping statistics on placement of our alumni in academia, industry, government institutions, etc. Many of our alumni work in industry. They are employed by Intel Corp., The Goodyear Tire & Rubber Comp., Hyland Software, IBM, Oak Ridge National Laboratory, Synopsys Inc., Alcatel-Lucent, IBM India, Xerox Corp., to name a few of them. A number of our graduates are working in academia. They are employed by Missouri University of Science and Technology, Cleveland State University, Walsh University, The University of Akron, Louisiana Tech. University, Texas A&M University, Texas State University, Wayne State University, Western Washington University, to name few of them. In October 2008, the department held its 2008 KSU CS Graduate Alumni Reunion workshop. A large number of graduates participated in the workshop and gave feedback. Our recent BS, MS and PhD graduates easily find jobs, with many staying in Ohio to work at local companies, such as Progressive Insurance, NASA Lewis, Goodyear, Cisco Systems, Hitachi Medical, Davey Tree, Fed Ex, Ernst & Young, Philips Medical, Sherwin Williams, National Bank, Key Corp, Procter and Gamble, Lexis-Nexis, Bell and Howell, etc.
F. Resources. (1 page maximum) (Check appendices listing for data that needs included)

1. In what way does the department maximize the use of its personnel (faculty and staff) resources?

Faculty teach most undergraduate courses, and generally teach one graduate elective per year. Sabbaticals and grant releases are covered by the department. Office staff assist with class and room scheduling; manage the departmental, graduate, and grant budgets; and assist with reports. System Staff serve both the Computer Science and Math Departments and have shared skills as well as individual specializations.

2. In what ways does the department maximize the use of material resources such as space, equipment, operating funds, etc? What information technology and library support is needed for this department?

Space is primarily allocated based on active, supported graduate students. Until recently, faculty needing specialized equipment could request OBR equipment funds in a competitive process twice per year.

3. What strategies does the department employ to develop alternate sources of revenue?

Under the new RCM budget model, Master’s students provide more income than undergraduate students (roughly 2x in state subsidy and tuition) so the department may choose to market and expand the non-thesis Masters program. Marketing and expanding summer course offerings could also help, since faculty benefit rates are lower then. More extramural funding would also provide an increase in departmental overhead funds.

4. What additional resources must the department acquire in order to do its job well? What evidence, sufficient to convince deans and provosts, has this department review assembled?

With the loss of the OBR funds and KSU’s switch to RCM, the department now has a $2M deficit and faces the loss of some GA funds. It is important that the university realize that the faculty size doubled under state direction to grow a doctoral program. Unfortunately, this came at a time in the computer science boom-bust cycle when undergraduate enrollments were declining nationally, exacerbating the financial crisis.

5. How do the resources available to the department compare to those available at other institutions in the state and nationally?

Compared to other CS PhD departments, KSU CS faculty salaries are close to national norms for Assistant Professors, but are 30% or more below the national median for full Professors. GA stipends are slightly less than national norms. The departmental physical space is about half the national norm for offices, research labs, and instructional labs.
G. Demand  (The department should indicate that it is responding to interests from its stakeholders. The review should answer the following questions.)

1. What is the method for projecting student need for the program(s) under review? What is the prediction for student need for the program for both the short-term and the long-term? What is the optimal number of majors for this program? How was that number determined?

The primary national forecast comes from the Bureau of Labor Statistics, released in the last quarter of odd-numbered years. For the past several reports, the forecast has been the same: for the next decade, around 60% of the new jobs plus net replacements in science and engineering will be for computer specialists.

A report from the Ohio Department of Job and Family Services concurs, predicting that computer software engineering and applications will be among Ohio’s fastest growing occupations between 2006 and 2016. That report predicts an employment growth rate in that area of 38.9% with an average of 880 annual job openings.

A more local forecast was NorTech’s “Northeast Ohio Information Technology Workforce Report”, released in March of 2008. That report shows that the need for IT professions in Northeastern Ohio was significantly more than the colleges and universities in the area were producing.

Based on the department’s number of faculty and classroom / lab availability, the department could support up to 350 undergraduate majors and 150 graduate students.

2. What is the method for projecting employer demand for graduates of this program? What is the expectation for employer demand for the program for both the short-term and long-term?

See answer to Question 1.

3. Who are the program’s major competitors? How is the program under review unique? What community need(s) is it meeting?

The major local competitor is the University of Akron, located only a short distance away. Other local competitors are Case Western Reserve (a private university), and Cleveland State and Youngstown State, both with departments that combine computer science and information systems in a single department. However, KSU is the only public university in the region offering a PhD in Computer Science.

The KSU Computer Science Department is also one of the few departments in the state with a PhD program that is housed in a College of Arts and Sciences at a public university. As a result, the department has strong ties across the sciences, resulting in interdisciplinary collaborations with the departments of Biological Sciences, Chemistry, Physics, Chemical Physics, etc.

See Section E5 for a list of some of the many Ohio employers that hire KSU CS graduates.
Action Plan (3-5 pages)

Summarize in 2-pages or less the strengths and opportunities of your department in comparison to the benchmark departments. Discuss in 3 pages or less what steps the department plans to move your department towards the stature enjoyed by the program(s) you hope to emulate. You will be asked for an interim report in 18 months after the conclusion of this review.

A. Department Strengths

In the tables below, the KSU CS Department is compared to the CS Department at three other universities in Ohio, to two “peer” departments, and to two “larger” departments that we might choose to emulate.

KSU’s CS Department is characterized by 18 faculty (19 if Kent State University at Stark is included), with few recent hires and the majority of the faculty at the full Professor level. The Department has slightly over 200 undergraduate majors, or slightly under 300 if the Regional Campuses are included. The Department has slightly fewer than 100 graduate students, with slightly more MS students than PhD students. The Department has GA funds for approximately 24 GAs (aid varies by level) and has 3 RAs on grant support.

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With the exception of Wright State University, which will be discussed later, most CS departments in the State of Ohio are not directly comparable. Both Ohio State University and the University of Cincinnati offer a PhD in CS, but Ohio State has a much larger department and the University of Cincinnati has a much smaller one. Like KSU, Ohio University is another state “corner” university, but it does not offer a PhD in CS and has a much smaller department. The only other university in the state offering a PhD in CS is Case Western Reserve University, which is a private university.

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The two universities in this part of the country that have CS departments that seem to most closely match KSU’s CS Department are the University of Kentucky and the University of Missouri-Columbia. Both departments have a similar number of faculty, undergraduate majors, and graduate students to the KSU CS Department, but a larger number of RAs. Both are also in a College of Engineering, unlike KSU’s CS Department, which is in a College of Arts and Sciences. However, the University of Kentucky has a Carnegie Classification of Very High Research Activity, unlike KSU, which is classified as High Research Activity.

Compared to the KSU CS Department, the University of Kentucky has slightly more faculty, but like KSU has a faculty where the majority are full Professors. They have a similar number of undergraduate majors and graduate students as KSU, though with a slightly higher ratio of PhD to MS students. Their number of GAs is comparable to KSU, though they have many more RAs.

Compared to the KSU CS Department, the University of Missouri-Columbia has a similar number of faculty, though the majority of their faculty are Associate Professors. They have slightly more undergraduate majors and graduate students than KSU, but a comparable PhD to MS ratio. They also have a comparable number of GAs, but like the University of Kentucky, have many more RAs.

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B. Department Areas Needing Improvement

Comparative data on extramural funding was not available, but since federal grants in computer science often support graduate students as RAs, the data above seems to suggest that the KSU Computer Science Department’s federal extramural funding is much less than its peers. Delaware Study Comparisons, comparing KSU’s CS Department to the university’s peers (though not necessarily the department’s peers), shows the KSU CS department to have 24%, 24%, and 31% of the research expenditures of those peers for AY 2005-06, 2006-07, and 2007-08, respectively.

C. Planned Department Changes or Developments with Timeline and Budget

The two universities in this part of the country that have CS departments that seem to be one step above KSU’s CS department are Wright State University and Wayne State
University. Wright State characterizes the path for growth in undergraduate majors and MS students, while Wayne State characterizes the path for growth in PhD students.

Like Ohio State University and the University of Cincinnati, Wright State University is an Ohio public university offering a PhD in CS. Compared to the KSU CS Department, Wright State University has a similar number of faculty, though more evenly distributed across faculty ranks. They have 36% more undergraduate majors and 41% more MS students, though a similar number of PhD students. Their number of GAs is half that of KSU, though they have more RAs. Like KSU, Wright State University has a Carnegie Classification of High Research Activity.

Compared to the KSU CS Department, Wayne State University has slightly more faculty, though the majority of their faculty are Associate Professors. They have a similar number of undergraduate majors and MS students as KSU, but 90% more PhD students. They also have more GAs and many more RAs. However, Wayne State University has a Carnegie Classification of Very High Research Activity.

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Taking the Wright State University path — striving for growth in undergraduate majors and Masters students — is the KSU Computer Science Department’s most likely path for growth in the near future. Growth in undergraduate majors could be achieved through a combination of increased outreach and improved retention.

The KSU Computer Science Department’s outreach activities waned over the years, but have improved recently. Several departmental faculty have started outreach activities with local middle schools. KSU’s Admissions Office recently started encouraging departmental contact with admitted undergraduate students, and calls to those students by departmental faculty seem to be well-received by the students and their parents. The department’s presentation on university open-house days has been updated to be more appealing to prospective majors.

The department has also placed a greater emphasis on undergraduate retention in the past couple of years. The outdated lab materials for CS 10051 Introduction to Computer Science are being updated this year, following similar updates last year in CS 23021 CSI: Programming and Problem Solving. After the loss of the department’s three non-tenure-track faculty due to budgetary concerns, four tenure-track faculty were selected as Undergraduate Advisors. More tenure-track faculty were assigned to teach required undergraduate classes this year, with departmental GAs generally teaching only CS 10001 Computer Literacy or lab sections of CS 10051 Introduction to Computer Science or CS 23021 CSI: Programming and Problem Solving. This shift of tenure-track
faculty into required courses freed more GAs for other duties, so the department now provides tutoring for all required CS classes through CS 33001 CSI: Data Structures and Abstraction.

Though the department has made many positive steps toward increasing outreach and improving retention, many other steps could be taken as well. The department could choose to build up its very small summer program by offering additional summer courses. However, those courses would have to be planned further in advance than in recent years, and marketed more aggressively, both internally to departmental majors as well as locally to the liberal arts colleges in the area. The department could choose to offer summer camps for local middle school students (as Wright State University does) in an effort to attract those students to computing during their formative years. The department could reach out more specifically to women and other under-represented groups, perhaps forming a local ACM-W Student Chapter to complement the local ACM Student Chapter. Undergraduate Teaching Assistants could be selected to complement Graduate Assistants as tutors and assistants in lab sections of CS 10051 Introduction to Computer Science or CS 23021 CSI: Programming and Problem Solving.

The Masters program also has potential for growth, particularly the new non-thesis MS option. Though not common in science departments at KSU, most of the department’s competitors in Ohio offer a non-thesis Masters degree as well as a thesis-based Masters. The non-thesis option can be particularly attractive for those students looking for a terminal degree at the Masters level and seeking a non-research position in industry. Those students can complete their coursework, and then quickly enter the workforce, as opposed to mostly completing their coursework but then spending the next year or two working on a thesis.

The number of departmental faculty and classroom space is sufficient to support growth in both undergraduate majors and graduate students to the Wright State University level. Undergraduate classes and lab sections are generally less than 20 students, while the department’s two first-floor classroom can hold 35 students. If class sizes were to increase by 50%, the department should be able to support as many as 300-350 undergraduate majors on the Kent State Campus. If classroom space could be found outside the Math and CS Building (which is quite problematic), this number could increase further. Similar growth in the number of graduate students could also be absorbed.

Taking the Wayne State University path — striving for growth in PhD students — is much harder with the recent loss of state funding for enhancing the department’s doctoral program, though is still a viable path. Though Wayne State’s distribution of GA/RA funds is unknown, they have funding for 55 graduate students, meaning they could fund as many of 69% of their 80 PhD students. The KSU CS Department could fund a similar ratio of its PhD students, with funding for 27 graduate students supporting 64% of its 42 PhD students. However, Wayne State has a much higher ratio of RAs to GAs, so if KSU CS faculty could raise their extramural research funding from the current level of 3 RAs to 20 RAs, 24 GAs + 20 RAs could support 2/3 of 66 PhD students — much closer to Wayne State’s 80 PhD students.