

It is useful to have some structured method for acquainting disabled students with the uses of computer access systems. This chapter describes the curriculum used in the California community colleges for five different classes which are intended to develop student proficiency in the use of adapted computer technologies. The courses are:

1. Computer Access Evaluation
2. Adapted Keyboarding
3. Computer Access I
4. Computer Access II
5. Computer Access Projects

Although they are listed sequentially, many students might appropriately begin with Computer Access I or even Computer Access II.

## **Curriculum Structure**

The courses are designed to allow for flexibility in managing student flow through the curriculum. Typically, a student would be referred to the High-Tech Center by an instructor or counselor. An initial interview with the student would determine the need to begin with the Evaluation and Keyboarding courses or whether the student could proceed directly to Computer Access I.

The first two courses listed, Computer Access Evaluation and Adapted Keyboarding, provide valuable periods in which to assess the access needs of severely disabled students and develop keyboarding skills, before beginning work on word processing tasks.

## **Computer Access Evaluation**

This course can be presented in two ways: either as a series of meetings with the student over a period of weeks or as a small number of lengthy sessions. Selection of the structure is left up to the college and/or the specialist who will be doing the evaluation.

Clearly, not all students will need to take this class. It is intended primarily to assess severely disabled students whose access needs are substantial and complex. During this course, range of motion and keyboard access evaluations might be performed, access methods identified, special systems configured, and a preliminary introduction to equipment usage begun. This course may be taken concurrently with the keyboarding class.

## **Adapted Keyboarding**

Many students come to High-Tech Centers with poor keyboarding skills. As a general rule, it is recommended that students be referred to mainstream typing classes to learn keyboarding skills. This course is designed for those students who cannot function productively in mainstream typing courses.

This is not seen as a corequisite for Computer Access I if students have inadequate typing skills. For such students it should be a prerequisite. In that way, student participation in Computer Access I is not hampered by lack of knowledge of the keyboard.

Experience has shown that attempting to master keyboarding, an access technology, and word processing, simultaneously, is too much for students to assimilate in a productive manner.

A student who successfully completes the class will have developed touch typing skills and a basic

typing rate of at least 20-25 words per minute. Students with orthopedic disabilities which prohibit typing at this rate will exit this course with a complete familiarity of all key locations.

Low vision or blind students may require specialized instruction in order to complete this course.

## **Computer Access I**

This course introduces the student to the use of access technologies appropriate to his or her disability within the context of basic word processing.

Students who do not require the assessment or keyboarding class will usually enroll in this course first.

This is a basic introductory course and is generally not repeated. Successful students move on to varied activities in the Computer Access II course.

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## **Computer Access II**

This is the second semester of work begun in Computer Access I. Usually there are two types of course work being done in this class: advanced word processing and work with other related applications, such as database management and spreadsheet software.

Additional versions of this class can be created to meet specific software application or subject area needs.

## **Computer Access Projects**

This course is primarily designed for larger centers. It is intended for students who have completed

High-Tech Center curriculum but need to use High-Tech Center facilities in order to compete successfully in academic course work. These students typically need assistance in learning to use access technologies in new or unusual ways.

## **Course Title: Computer Access Evaluation**

### **Prerequisite/Corequisite**

A student must be eligible for services and instruction from Disabled Student Programs and Services through appropriate verification of a primary disability by certificated personnel and be able to benefit from the programs and services offered by the High-Tech Center.

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### **Class Format**

Individualized assessment, by arrangement.

### **Units**

One-half unit of credit for a total of nine hours of individualized assessment activities.

### **Rationale**

A determination of a student's access requirements may be needed in order to determine the feasibility of that student's participation in High-Tech Center classes. The first step in this process is to ascertain whether or not a match can be made between the technological capabilities of the Center and the disabled student's access requirements.

### **Course Description**

This course is designed to provide a means for in-depth computer access evaluation in order to determine an

appropriate access environment for a student with one or more disabilities. Likely participants in this course would include (1) multiply handicapped, (2) severely physically disabled, (3) students with acquired brain injuries resulting in secondary orthopedic and/or visual disabilities, (4) re-entering disabled older students, (5) blind, or (6) other students on recommendation of the instructional staff.

## **Objectives**

1. Through assessment and evaluation the student will be matched with the disability-appropriate adaptation in the following areas:
  - a. Keyboard access
  - b. General mobility and seating
  - c. Cognitive processing abilities
  - d. Educational goals
2. On the basis of the assessment, it will be determined if the student can be appropriately served by the access technologies available in the High-Tech Center.
3. As determined by instructor observation, the student must exhibit appropriate adaptive behavior for successful participation in the educational setting.

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## **Course Content and Scope**

**Module 1:** Intake interview and review of student's history including

1. Educational goals and objectives
2. Existing familiarity with computer systems, if any
3. Review of existing medical records, if appropriate
4. Review of academic records, if appropriate

**Module 2/3:** Diagnostic instruction where appropriate to evaluate:

1. Keyboard access capabilities
2. Mobility and seating
3. Ability to manage tasks associated with basics of access technology and computer system
  - a. Can the student carry out multi-part instructions?
  - b. Can the student perform physical tasks necessary for computer use; e.g., turning on the computer, inserting the disk?

**Module 4:** Prescriptive selection and assembly of an appropriate array of access devices based on mobility and access evaluation

**Module 5:** Basic introduction to and trial use of access devices. Adjustment of access devices based on student use.

**Module 6:** Recommendations and referrals. On the basis of the evaluations undertaken in this class, the instructor will prepare a prescriptive list of appropriate adaptive technologies and discuss the results with the student.

**Module 7:** Development of an Individualized Education Plan (IEP) for students who will be taking other High-Tech Center classes

### **Course Outline Components Not Appropriate to This Course**

1. Reading and Writing Assignments
2. Outside Assignments
3. Critical Thinking

## **Primary Method of Instruction**

Individualized assessment by the instructor

## **Means of Evaluation**

A student will receive one-half unit of credit upon completion of the seven course modules.

## **Grading**

The course is offered on a Credit/No-Credit basis.

## **Course Completion Outcome**

1. Successful computer access systems are identified and the student is recommended for enrollment in High-Tech Center Computer Access I.
2. Generation of an IEP for students who successfully can use a computer through the use of adapted technologies provided in the High-Tech Center.
3. If no appropriate access technologies are available through the High-Tech Center the student is referred to other resources.

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## **Text/Supplies Required**

Items of a personal nature (e.g., mouthstick, head wand, or a unique access device) must be provided by the student.

## **Course Title: Adapted Keyboarding**

### **Prerequisite/Corequisite**

A student must be eligible for services and instruction from Disabled Student Programs and Services through appropriate verification of a primary disability by cer-

tificated personnel and be able to benefit from the programs and services offered by the High-Tech Center. Computer Access Evaluation may be required as a prerequisite or corequisite, if appropriate.

### **Class Format**

This course is a lab class.

### **Units**

This is a variable unit class. One-half unit of credit will be granted upon completion of 24 hours of lab work; or one unit of credit will be granted upon completion of 48 hours of lab work.

### **Rationale**

Touch typing skills are useful for appropriate speed and performance in word processing tasks. This course is necessary for students who are not able to participate successfully in mainstream typing classes. Adapted computer technologies will be used in conjunction with software keyboarding tutorials.

### **Course Description**

This course is designed to teach keyboarding basics to disabled students who (1) must use adaptive technologies for successful access to the keyboard or screen and/or (2) are unable to compete successfully in mainstream typing classes.

### **Objectives**

1. The student will demonstrate, by the end of the course, effective use of an appropriate access technology (e.g., VISTA, Filch) if needed, in conjunction with the software program used to teach keyboarding. The student will be able to complete lessons independently.

2. The student will demonstrate key-stroking proficiency with at least one computer keyboard in order to complete the minimum requirements of this course. This key-stroking proficiency will demonstrate familiarity with the following areas:
  - a. The alpha-numeric components of the computer keyboard (the QWERTY configuration)
  - b. The specialized areas of the keyboard (the numeric keypad, the arrow keys, the function keys) and the special control keys (e.g., CONTROL, ALT, DELETE, CAPS LOCK)
3. The student will develop appropriate touch typing techniques on the alphabet portion of the keyboard.
4. The student will achieve a minimum typing speed of 22 words per minute with a maximum of two uncorrected errors per minute on a three-minute timed test of copy writing, in order to be recommended for further instruction and service through the High-Tech Center.\*
5. For a student whose disability prevents a minimum typing criterion score, demonstration of familiarity with the physical configuration of the keyboard layout will be required. These students might typically include, but are not limited to, persons with orthopedic disabilities, neuromuscular disorders or acquired brain injury.

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### **Course Content and Scope**

Touch typing skills will be taught through the use of software tutorials. TYPYST is an example of a software program compatible with access technologies: e.g.,

\*This words-per-minute minimum criterion is that recommended in the *Keyboarding Curriculum Guidelines* published by the State of Washington in July, 1986.

VISTA, which provides access for low vision students, or Filch, which provides keyboard control for orthopedically impaired students unable to efficiently use a standard keyboard. Any keyboarding tutorial similarly compatible with access technologies may be used.

If the program TYPIST is used, the following would serve as appropriate course content.

The student will learn:

1. The keyboard layout
2. Which finger types which key
3. Good technique in keystroking  
The student will monitor keystroking activity by observing graphically displayed keystroke patterns as evaluated by the TYPIST program.
4. To keep his or her eyes on the screen
5. To develop speed in typing short sequences of keys
6. To develop accuracy in typing short sequences of keys
7. To develop speed in typing short phrases, sentences, paragraphs
8. To develop accuracy in typing short phrases, sentences, paragraphs
9. To successfully copy text for a one-minute, timed writing at a gross striking rate of at least 22 words per minute, allowing for two error words per minute.
10. To successfully copy text for a three-minute, timed writing at a gross striking rate of at least 22 words per minute, allowing for two error words per minute.

\*These timed writings will be administered by the instructor; they are not a part of the TYPIST program.

## **Course Outline Components Not Appropriate to This Course**

1. Readings and Writing Assignments
2. Outside Assignments

### **Critical Thinking**

Critical thinking is inherent in working through a program of instructional software in which a student must make choices based on the results of previously completed activities. Because this is a step-by-step process, it is called a sequenced software program.

In order to proceed successfully through a sequenced program, a student must deduce which menu option is most appropriate upon completion of a task, if there are no other specific instructions or procedural indicators. To do this, the student must analyze and evaluate his performance on the task just completed and must use deductive reasoning to make the most appropriate menu choice.

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### **Primary Method of Instruction**

Instructor-supervised computer assisted instruction in a lab setting.

### **Means of Evaluation**

A student's familiarity with the keyboard will be measured by performance on timed typing tasks. The student will achieve a minimum stroking rate of 22 words per minute with a maximum of two uncorrected errors per minute on a three-minute, timed test of copy writing.

In some instances, the instructor may decide that a student's disability legitimately prevents him or her from reaching the target minimum speed. For such a student, demonstration of obvious familiarity with the physical keyboard should be the factor determining successful completion of the class.

Students who are unable to meet the target minimum speed, and who have no mitigating disabling condition, could be regarded as not yet ready for High-Tech Center classes.

### **Grading**

This course is offered on a Credit/No-Credit basis.

### **Course Completion Outcome**

Assuming the absence of intervening disabilities, the student will, upon successful completion of this course, demonstrate touch typing skills and a basic typing rate of at least 22 words per minute with a maximum of two uncorrected errors per minute. The student may demonstrate a familiarity with more than one type of computer keyboard.

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### **Texts/Supplies Required**

None

### **Course Title: Computer Access I**

### **Prerequisite/Corequisite**

1. A student must be eligible for services and instruction from Disabled Student Programs and Services through appropriate verification of a primary disability by certificated personnel and be able to benefit from the programs and services offered by the High-Tech Center.
2. Successful completion of and referral from the Computer Access Evaluation class may be required.
3. Adapted Keyboarding is required as a prerequisite if a student does not have adequate touch typing skills (approximately 20 wpm).

Note: Touch typing skills are not required for a student with orthopedic disabilities, but such a student must have an established, independent means of accessing the keyboard.

### **Class Format**

Lecture, two hours per week with 1-2 hours of lab per week

### **Units**

Two units of credit are allowed. (Three units can be earned if 48 hours of lab time are completed.)

### **Rationale**

In order to participate successfully in post-secondary education, access to microcomputers is extremely useful for students with disabilities. Since written communication is a primary requirement for success in both academic and job-related environments, the course introduces the use of specialized computer access systems within the context of word processing.

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### **Course Description**

Designed for students with visual, physical, learning disabilities, hearing loss, or deafness, this course provides training in the use of computer access technologies which enhance a disabled student's ability to access and use microcomputers.

Training in the use of computer access technologies will occur in the context of word processing. The course will familiarize students with basic concepts of word processing used by the majority of industry-standard word processors, e.g., WordStar, WordPerfect.

## **Objectives**

1. Evaluation and selection of access technologies appropriate to the student's disability if the student has not completed the Computer Access Evaluation class.
2. Instruction in the use of access technologies appropriate to the student's disability in the context of word processing. Specialized areas of instruction might include, but not be limited to, individual and/or small group instruction in the use of:
  - a. **MindReader**  
A specialized word processing environment for moderately to severely orthopedically disabled, learning disabled, and deaf or hard-of-hearing students.
  - b. **Turbo Lightning or Coach Professional**  
A continuous, real-time spell-checker and thesaurus for use by all disability groups.
  - c. **Vista/NicePrint or InLARGE**  
Hardware and software for large text on computer screen and from printer for low vision or learning disabled students.
  - d. **DECTalk/Freedom1/Outspoken**  
Screen reading and speech output for the blind, low vision or learning disabled.
  - e. **Filch or Easy Keys**  
Keyboard adapter for physically disabled, learning disabled, low vision or blind students.
  - f. **Keytronics KB5153 Keyboard**  
Specialized keyboard for use by physically or learning disabled persons.

## **Course Content and Scope**

The total instructional period for use of specialized access devices will be four weeks. The remainder of the semester will be spent in using the access technology in the context of word processing.

It is anticipated that blind students will require the entire four weeks for beginning efficiency with screenreading techniques. Moderately physically disabled students will require two weeks to develop beginning proficiency with their specific access technology, all other students will require approximately one week to develop beginning proficiency.

Upon achievement of beginning competency levels with appropriate access technologies, students will use the balance of this initial four-week period to review computer keyboarding skills through the use of computer-assisted tutorials. Within the remaining 12 weeks, the following competencies will be acquired in the approximate time periods listed.

**Weeks 1-4:** The student will develop competency in a specialized access adaptation and review basic keyboarding skills.

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**Week 5:** The student will become familiar with basic use of microcomputers in conjunction with specialized computer access systems.

The student will understand and appropriately perform:

1. Disk handling
2. Basic startup procedures
3. Basic DOS commands

**Week 6:** The student will be able to understand and define the following word processing concepts and structures.

1. Word processing
2. File
3. Document

4. Word wrap
5. Edit
6. Format
7. Pagination
8. Spelling check
9. Data disk/program disk

**Weeks 7-9:** Using appropriate adaptive technology, the student will be able to open or edit a document and use the following basic word processing procedures.

1. Move cursor to any point on screen
2. Erase, insert and edit text
3. Change margins, line spacing and tab settings
4. Move marked blocks of text within document
5. Print a file
6. Save and retrieve word processing documents

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**Weeks 10-16:** The student will successfully apply computer access technologies and basic word processing skills in creating and editing.

1. Business letter format
2. Memo format
3. Essay format
4. Outline format

**Week 17:** Course review

**Week 18:** Final exam

### **Reading and Writing Assignments**

1. Students will read chapters from assigned text

2. Students will complete many writing assignments in the context of word processing tasks. Examples:
  - a. Content appropriate to a business letter
  - b. A tutorial manual which details basic word processing commands and tasks
  - c. Short essays on specified subjects

## **Outside Assignments**

Readings in the assigned text.

## **Critical Thinking**

Critical thinking is involved in the successful execution of all computer tasks; e.g., which command is appropriate to which situation.

Examples of specific projects which require critical thinking:

1. Students will independently solve unfamiliar problems: students will be given a "jumbled" file and will reassemble it into an appropriate form matching hard copy by using word processing commands (e.g., block moves, deletions). Students will not reassemble the file by simply typing in the correct form.
2. Students will apply principles of editing in a word processor by editing a severely misspelled and poorly produced file. Students will be expected to analyze word usage and, if necessary, determine the semantically correct word as spelling is corrected. Students will observe standard typing format protocol in the editing of this file.
3. Topics for text production necessary to complete word processing tasks will require critical thinking skills: e.g., clarifications, new solutions, evaluations, comparisons.

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4. The student is expected to prioritize steps to complete assignments within the allotted lab time. Where applicable, the student is expected to apply concepts learned in this class to assignments for other classes.

### **Method of Instruction**

This class will be conducted on a small group or individual basis.

### **Means of Evaluation**

Grades are arrived at as follows:

|     |                   |
|-----|-------------------|
| 30% | Class assignments |
| 20% | Quizzes           |
| 20% | Midterms          |
| 30% | Final             |

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Typical examinations will require a knowledge of word processing commands and the actions they perform.

Students will also be evaluated on the successful completion of "hands-on" tasks given as evaluation measures.

### **Grading**

This course is offered on a Credit/No-Credit basis.

### **Course Completion Outcome**

Upon successful completion of this course, the student will be familiar with the access devices appropriate to his or her disability and will demonstrate knowledge of basic word processing skills.

### **Text/Supplies Required**

A basic college-level word processing text for the specific word processor used is required. Students are requested to provide two floppy disks.

Items of a personal nature (such as a mouth stick or head wand or a unique electronic access device) must also be provided by the student.

## **Course Title: Computer Access 11**

### **Prerequisite/Corequisite**

A student must be eligible for services and instruction from Disabled Student Programs and Services through appropriate verification of a primary disability by certificated personnel and be able to benefit from the programs and services offered by the High-Tech Center.

Instructor approval and successful completion of Computer Access I is necessary. The instructor may directly refer a student to Computer Access II if the student has had prior experience with access technologies and exhibits adequate touch typing skills.

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### **Class Format**

Lecture, two hours per week, plus 1-2 hours of lab per week.

### **Units**

Two (or three with a total of 48 hours of lab work).

### **Rationale**

This course is designed to further refine computer access skills. Students who have completed Computer Access I may have developed only a beginning competency in their prescribed access technologies and will require additional instruction in order to fully utilize their access systems.

## **Course Description**

This course is designed for disabled students who have successfully completed Computer Access I. Students will enhance their computer access skills through the completion of assignments or projects.

## **Objectives**

Objectives will be individualized and based upon student educational/vocational objectives. Possible objectives are stated below.

For students pursuing advanced word processing tasks: The student will demonstrate skill in the use of a computer access application in the context of advanced word processing tasks such as mailmerge functions, columnar block moves, editing multiple documents, advanced formatting and stylistic techniques which require sophisticated knowledge of a particular access device.

For students learning other software applications: The student will develop competency in the use of an adapted computer application in conjunction with such widely used computer programs as spreadsheets, database managers, accounting systems or computer assisted design.

## **Course Content and Scope**

Course content will depend upon the unique access needs of the student and type of skills to be developed by the student. Typical examples of course modules could include one or more of the following:

1. Development and refinement of screenreading skills for blind students. This might include a sequence of activities encompassing screen reading techniques for advanced word processing applications or other software programs.

2. Development and refinement of access skills for low-vision students in the context of visually intensive software applications such as spreadsheets or desktop publishing.
3. Further basic access skills development for students with extremely slow text entry capabilities (head wand or mouth stick keyboard entry, or limited manual entry) in the context of word processing or other applications.

### **Reading and Writing Assignments**

1. Students will be assigned readings from required texts as needed to learn new applications.
2. Writing assignments are components of almost all word processing tasks.

### **Outside Assignments**

Assignments will consist largely of projects and studies from other classes in which the student is concurrently enrolled. The completion of these assignments and studies will require the learning of new and advanced skills in the use of adapted computer technologies.

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### **Critical Thinking**

Critical thinking skills are involved in all activities of this class. Students will be required to synthesize new information and apply it to known and new situations as they develop skills in using their access technology in the context of new applications. (Example: A student will develop an instructional manual describing the use of his/her access device in conjunction with a new computer application.)

### **Method of Instruction**

This class will be conducted primarily on an individual and small group lecture/lab basis.

## **Means of Evaluation**

|     |                   |
|-----|-------------------|
| 30% | Class assignments |
| 20% | Quizzes           |
| 20% | Midterms          |
| 30% | Final             |

Example: A blind student will be given a final exam on disk. The exam will require the student to deduce that he or she must apply advanced screen reading techniques in order to appropriately complete the assigned task (e.g., the need to read the file directory at the opening menu and the need to read large or small menus while working in a file).

## **Grading**

This course is offered on a Credit/No-Credit basis.

## **Course Completion Outcome**

Upon successful completion of this course the student will demonstrate sophisticated access skills, in conjunction with advanced word processing or other software applications, as well as the ability to apply these skills to new and novel situations.

## **Text/Supplies Required**

Student supplies his/her own disks. Texts as required by type of computer access project.

## **Course Title: Computer Access Projects**

## **Prerequisite/Corequisite**

A student must be eligible for services and instruction from Disabled Student Programs and Services through appropriate verification of a primary disability by cer-

tificated personnel and be able to benefit from the programs and services offered by the High-Tech Center.

Instructor permission is required. It is expected that students who enroll for this class will be able to work independently in the lab and will require instructional support only for new aspects of the access technology which they are employing.

### **Class Format**

This course is a lab project course.

### **Units**

This is a variable unit course; one unit of credit will be granted upon completion of 48 hours of lab work. One-half unit of credit will be granted upon completion of 24 hours of lab work.

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### **Rationale**

This course is designed for students who have completed the regular High-Tech Center curriculum and who must learn new and advanced areas of their adapted technologies in order to complete other classroom assignments or special projects.

### **Course Description**

This course is designed for students who require access to specialized adaptive technologies in order to complete assignments for other classes in which they are concurrently enrolled.

### **Course Objectives**

1. The student will learn new skills associated with highly specific applications of his/her access technology.

2. The student will acquire advanced problem-solving skills in the use of his/her access technology.

### **Course Content and Scope**

1. The student will meet with the instructor to discuss the project which the student wishes to complete.
2. Based on this student/instructor discussion, the instructor will determine the validity of the project and what new aspects of the student's access technology must be taught within the scope of this assignment.
3. The student will complete a contractual agreement which details the work to be done, the ACT assistance to be required, and the estimated length of time needed to complete the assignment.

Basic instruction will involve new applications of access technologies used in the High-Tech Center. Applications will vary from student to student.

Typical examples of such work would be a low vision student learning to use access technologies with software required for an accounting class; or, a blind student using a screen reading program to develop complex screen layouts for a course in poetry composition.

### **Critical Thinking**

Critical thinking is directly involved in the successful completion of all aspects of work for this course. The ability to work independently without requiring specific instruction except in the new use of the access technology is a demonstration of use of critical thinking skills.

### **Method of Instruction**

This class will be conducted on a lab basis.

**Means of Evaluation**

Completion of class project and mastery of new access applications as described in the student/instructor contractual agreement.

**Grading**

This course is offered on a Credit/No-Credit basis only.

**Course Completion Outcome**

The student will have successfully used his or her type of adaptive technology in a new context.

**Text/Supplies Required**

Student must provide his/her own disk.

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