The *Journal of Mathematics Education at Teachers College* is a publication of the Program in Mathematics and Education at Teachers College Columbia University in the City of New York.

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Aims and Scope

The *JMETC* is a re-creation of an earlier publication by the Teachers College Columbia University Program in Mathematics. As a peer-reviewed, semi-annual journal, it is intended to provide dissemination opportunities for writers of practice-based or research contributions to the general field of mathematics education. Each issue of the *JMETC* will focus upon an educational theme. The themes planned for the 2012 Fall-Winter and 2013 Spring-Summer issues are *Equity* and *Leadership*, respectively.

JMETC readers are educators from pre-K-12 through college and university levels, and from many different disciplines and job positions—teachers, principals, superintendents, professors of education, and other leaders in education. Articles to appear in the *JMETC* include research reports, commentaries on practice, historical analyses, and responses to issues and recommendations of professional interest.

Manuscript Submission

JMETC seeks conversational manuscripts (2,500-3,500 words in length) that are insightful and helpful to mathematics educators. Articles should contain fresh information, possibly research-based, that gives practical guidance readers can use to improve practice. Examples from classroom experience are encouraged. Articles must not have been accepted for publication elsewhere. To keep the submission and review process as efficient as possible, all manuscripts may be submitted electronically at www.tc.edu/jmetc.

Abstract and keywords. All manuscripts must include an abstract with keywords. Abstracts describing the essence of the manuscript should not exceed 150 words. Authors should select keywords from the menu on the manuscript submission system so that readers can search for the article after it is published. All inquiries and materials should be submitted to Ms. Krystle Hecker at P.O. Box 210, Teachers College Columbia University, 525 W. 120th St., New York, NY 10027 or at JMETC@tc.columbia.edu.

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Call for Papers

The "theme" of the fall issue of the *Journal of Mathematics Education at Teachers College* will be *Equity*. This "call for papers" is an invitation to mathematics education professionals, especially Teachers College students, alumni and friends, to submit articles of approximately 2500-3500 words describing research, experiments, projects, innovations, or practices related to equity in mathematics education. Articles should be submitted to Ms. Krystle Hecker at JMETC@tc.columbia.edu by September 1, 2012. The fall issue's guest editor, Mr. Nathan N. Alexander, will send contributed articles to editorial panels for "blind review." Reviews will be completed by October 1, 2012, and final manuscripts of selected papers are to be submitted by October 15, 2012. Publication is expected by November 15, 2012.

Call for Volunteers

This *Call for Volunteers* is an invitation to mathematics educators with experience in reading/writing professional papers to join the editorial/review panels for the fall 2012 and subsequent issues of *JMETC*. Reviewers are expected to complete assigned reviews no later than 3 weeks from receipt of the manuscripts in order to expedite the publication process. Reviewers are responsible for editorial suggestions, fact and citations review, and identification of similar works that may be helpful to contributors whose submissions seem appropriate for publication. Neither authors' nor reviewers' names and affiliations will be shared; however, editors'/reviewers' comments may be sent to contributors of manuscripts to guide further submissions without identifying the editor/reviewer.

If you wish to be considered for review assignments, please request a *Reviewer Information Form*. Return the completed form to Ms. Krystle Hecker at hecker@tc.edu or Teachers College Columbia University, 525 W 120th St., Box 210, New York, NY 10027.

Looking Ahead

Anticipated themes for future issues are:

Fall 2012	Equity
Spring 2013	Leadership
Fall 2013	Modeling
Spring 2014	Teaching Aids

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Spring – Summer 2012

A Century of Leadership in Mathematics and its Teaching

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Assessment in a Common Core Era: Revolutionary or Evolutionary?

Allen M. Dimacali
College Board*

In conjunction with the adoption and subsequent implementation of the *Common Core State Standards for Mathematics* (CCSSM), state-led consortia are developing next-generation assessments aligned to the CCSSM. This paper discusses the progress and plans of two main coalitions of states—the Partnership for Assessment of Readiness for College and Careers (PARCC) and the SMARTER Balanced Assessment Consortium (SBAC)—as they work to develop new and innovative assessments to measure the CCSSM and replace current state assessments. They attempt to integrate into each of their assessment systems various facets of testing (e.g., online administration, computer adaptive testing, performance-based tasks) already in existence. What is proposed to be revolutionary and innovative in testing appears more like the next evolutionary step in assessment. Scheduled for full implementation in 2014–2015, what remains to be seen is whether these assessments can accomplish two goals: (1) close the gap with NAEP and (2) replace college placement tests.

Keywords: *Common Core State Standards*, Race to the Top, assessment consortia, PARCC, SMARTER Balanced, next-generation assessments.

*Researchers are encouraged to express their professional judgment freely. Therefore, points of view or opinions stated in this article do not necessarily represent official College Board position or policy.

Introduction

As the education paradigm of high school completion shifts to college and career readiness, the *Common Core State Standards* initiative transitions from adoption to implementation in 45 states and the District of Columbia. Schools are expected to implement the *Common Core State Standards for Mathematics* (CCSSM) fully in 2014–2015, the same school year that assessments for student achievement and accountability for mastering the CCSSM are slated to be administered. Two consortia of states were awarded millions in federal Race to the Top funding to develop new and innovative assessment systems that will replace individual state tests and bring more consistency nationwide to assessments of student achievement (see Figure 1). What exactly will these next-generation assessments look like? They will serve multiple purposes: a measure of student achievement of the CCSSM, an accountability measure of a teacher's classroom effectiveness, and a measure of a student's preparedness to leave high school ready for post-secondary options, including entering college without the need to take remedial courses. Education stakeholders are carefully monitoring the progress of the two main assessment consortia and questioning whether the resulting assessments truly will be a new generation of innovative testing or just a continuation of current state testing with "national" versions. This paper discusses the work to date and planned undertakings of the Partnership for Assessment of College and Careers (PARCC) and the SMARTER Balanced Assessment Consortium (SBAC).

Assessment Consortia

In September 2010, the US Department of Education awarded approximately $330 million to two coalitions of states—the Partnership for Assessment of Readiness for College and Careers (PARCC) and the SMARTER Balanced Assessment Consortium (SBAC)—to develop the next generation of tests to measure student achievement of the CCSSM (US DOE, 2010). Each consortium is led by a subset of governing states who have committed to implementing and administering that consortium's assessment system statewide during the 2014–2015 school year. Six states serve as participating or advisory states within both consortia: Alabama, Colorado, Kentucky, North Dakota, Pennsylvania, and South Carolina. (Wyoming is an advisory state for SBAC.) All other states are governing states for one of the two consortia (see Table 1).

Partnership for Assessment of Readiness for College and Careers

Originally a coalition of 26 states, PARCC currently consists of 23 states and the District of Columbia, including 10 of the 12 winners of Race to the Top federal funding. Massachusetts chairs the governing board, while Florida serves as the consortium's fiscal agent. PARCC has partnered with Achieve to project-manage the work and carry out the decisions of its governing board.

PARCC's "mathematics assessments will determine the extent to which students are college- and career-ready or on track in mathematics by measuring whether they have

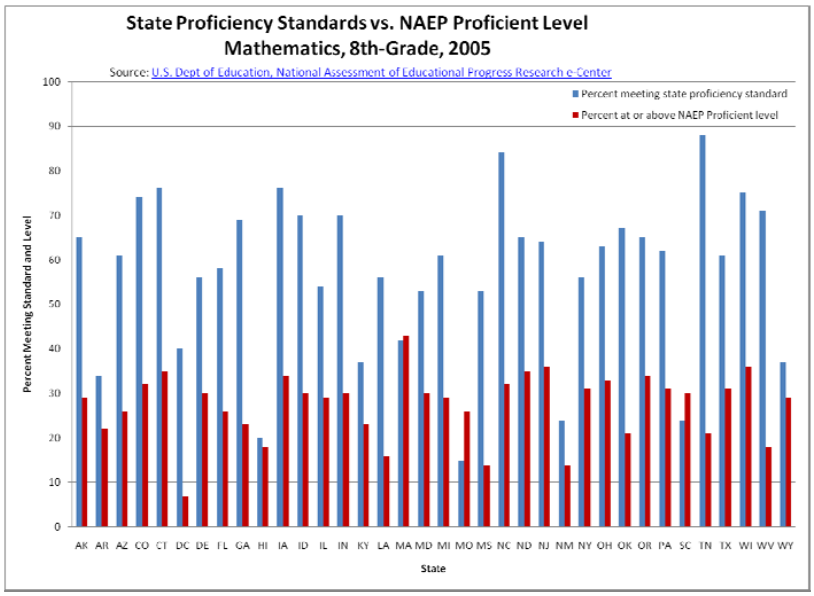


Figure 1. A comparison of proficiency achievement on state assessments and NAEP

Table 1. Governing States in the Assessment Consortia

Partnership for Assessment of Readiness for College and Careers (PARCC)		SMARTER Balanced Assessment Consortium (SBAC)	
Governing States:		Governing States:	
Arizona	Massachusetts	Alabama	Montana
Arkansas	Mississippi	California	Nevada
District of Columbia	New Jersey	Connecticut	New Hampshire
Florida	New Mexico	Delaware	North Carolina
Georgia	New York	Hawaii	Oregon
Illinois	Ohio	Idaho	South Dakota
Indiana	Oklahoma	Iowa	Utah
Louisiana	Rhode Island	Kansas	Vermont
Maryland	Tennessee	Maine	West Virginia
		Michigan	Wisconsin
		Missouri	

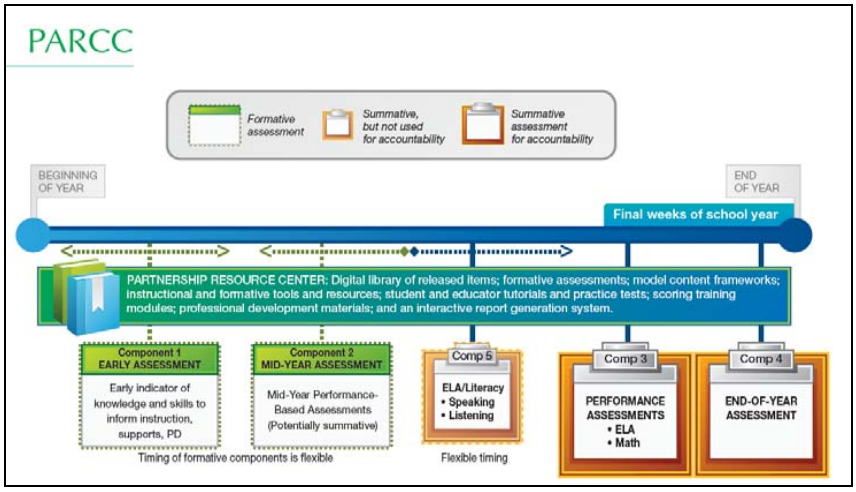


Figure 2. Overview of PARCC Assessment System

mastered the key big ideas for each grade-level identified in the [CCSSM], and whether they can apply those knowledge and skills to solve meaningful and novel problems" (PARCC, 2011a). The consortium is developing an assessment system for mathematics that will include two non-summative, optional components (diagnostic and mid-year assessments) and two summative, required components (performance-based assessments and end-of-year assessments for grades 3–8 and end-of-course assessments for high school). Only scores from the summative assessments will be used for accountability purposes. Figure 2 shows an overview of PARCC's assessment system.

The consortium's released Model Content Frameworks document (to be finalized at a later date) focuses on curriculum and instruction. By identifying the "big ideas" of the CCSSM and prioritizing the standards, a scope and sequence of the CCSSM is implied, though not suggested. Although no examples of assessment items have yet been released, PARCC's document provides much narrative to inform the development of test blueprints and item specifications. PARCC does state that its assessment system "will include a mix of items, including short- and extended-response items, performance-based tasks, and technology-enhanced items" (2011b, p. 5).

SMARTER Balanced Assessment Consortium

What started as a coalition of 31 states, SBAC's membership currently consists of 28 states, including four Race to the Top winners. Utah and Idaho co-lead the governing board, and the consortium's fiscal agent is Washington. WestEd is SBAC's project management partner.

Similar to PARCC, SBAC proposes to provide two optional interim assessments and two summative assessments. The summative assessments consist of a computer-adaptive assessment component and a performance task component. Only scores from the summative assessments will be used for accountability purposes. An overview of SBAC's assessment system is given in Figure 1 of Kepner and Huinker in this issue.

While PARCC's Model Content Frameworks document presents a curriculum-focused perspective, SBAC released for a second-round review a content specifications document that is much more assessment-focused. SBAC "provides clear and rigorous focused assessment targets that will be used to translate the grade-level Common Core standards into content frameworks along a learning continuum" (2011, p. 6). This document will further serve to inform the development of test blueprints and item/task specifications.

SBAC is committed to using evidence-based design to develop its assessment system. This model employs the use of claims, evidence, and assessment targets. Claims are statements of what students should know and be able to do mathematically. Evidence is student work that demonstrates achievement of the claim. Assessment targets are the key content and focus for assessment at each grade level. Appendix C of the SBAC content specifications document is a collection of several examples of items and tasks that could be used on a grade 8 assessment. Some items were developed by the consortia, and many others were taken from the Mathematics Assessment Resource Service (MARS) and the Programme for International Student Assessment (PISA). Such a collection of tangible examples should assist educators in implementing the CCSSM at the classroom level. Figures 3 and 4 illustrate a few examples of likely assessment items.

Current Assessments versus Next-Generation Assessments

In their current forms, the National Assessment of Educational Progress (NAEP) and most state assessments are paper-and-pencil based. That is, students record their answers to questions on an answer document to be scanned and scored. Multiple choice items are easily and quickly scored via computer. Items for which students must provide narrative responses require additional time to be

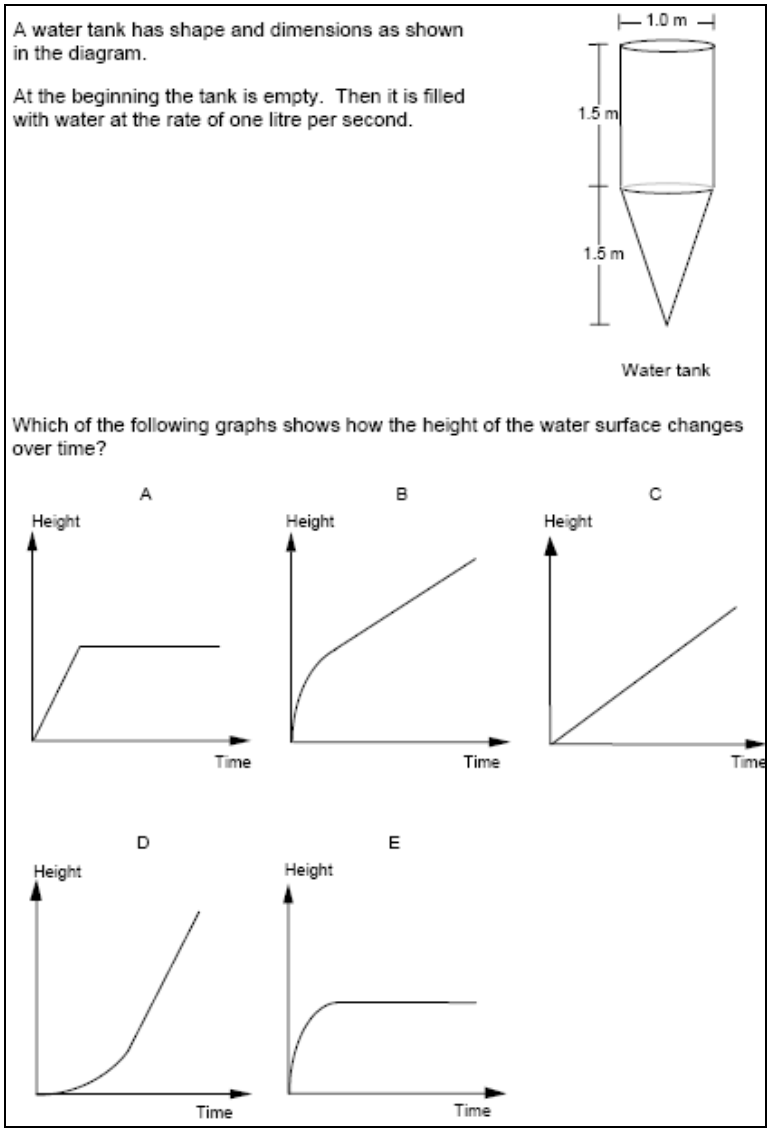


Figure 3. An example of a multiple choice assessment item taken from PISA

scored by trained human educators. An innovative feature of the next-generation assessments is the inclusion of technology-enhanced items in addition to the traditional multiple choice and short answer types of items.

What causes both excitement and alarm for educators is the integration of technology for administering these next-generation assessments. Assessments from both consortia will be administered via computer to provide for more timely feedback to schools, students, and their parents. These assessment systems propose to employ a combination of computer scoring and human scoring.

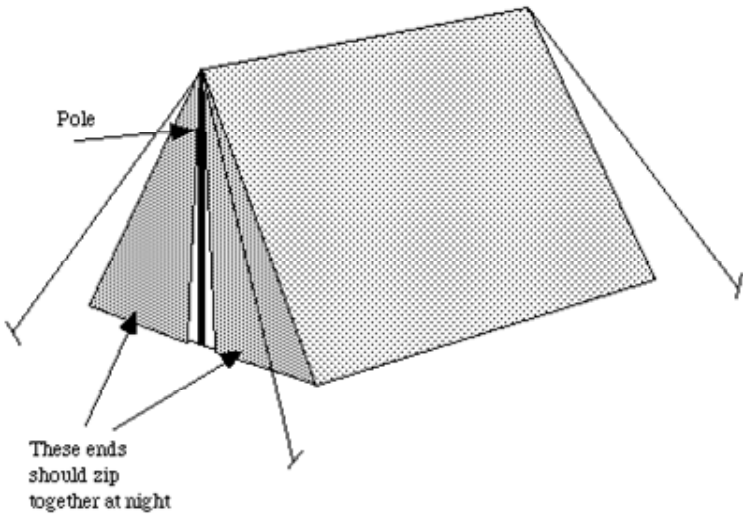
One attractive feature of the SBAC assessment system is the use of computer-adapted testing (CAT). That is, the system successively selects questions to maximize the precision of the assessment based on a student's responses to previous questions. From the student perspective, the difficulty of the assessment appears tailored to his or her mathematical ability level. As a result, the assessment provides a quick and accurate identification of the CCSSM students have mastered.

Technology, however, can be a costly expense. As state and school budgets continue to shrink, will all schools have the technological capabilities and support to administer and score these next-generation assessments come the 2014–2015 school year?

Because paper and pencil remain the natural media for mathematical work, both PARCC and SBAC propose to administer performance-based tasks in addition to multiple choice and short-answer items. Figure 5 shows a sample performance-based task for ELA taken from the Ohio Performance Assessment Project (Darling-Hammond, 2010). Performance-based tasks not only provide another tool for measuring the CCSSM but also allow students to apply the Standards for Mathematical Practice. Such 21st century skills as communication, creativity, and media literacy and capacities such as depth of understanding, research skills, and complex analysis can be satisfactorily assessed. However, performance-based tasks will most likely require the use of multiple class sessions to complete.

Other Common Core Assessments in Development

In addition to PARCC and SBAC, the US Department of Education also awarded grants to two other state coalitions: the National Center and State Collaborative Partnership and the Dynamic Learning Maps Alternative Assessment System Consortium. These two consortia are charged with developing assessment systems to measure college- and career-readiness specifically for students with disabilities.



Your task is to design a tent like the one in the picture.

Your design must satisfy these conditions:

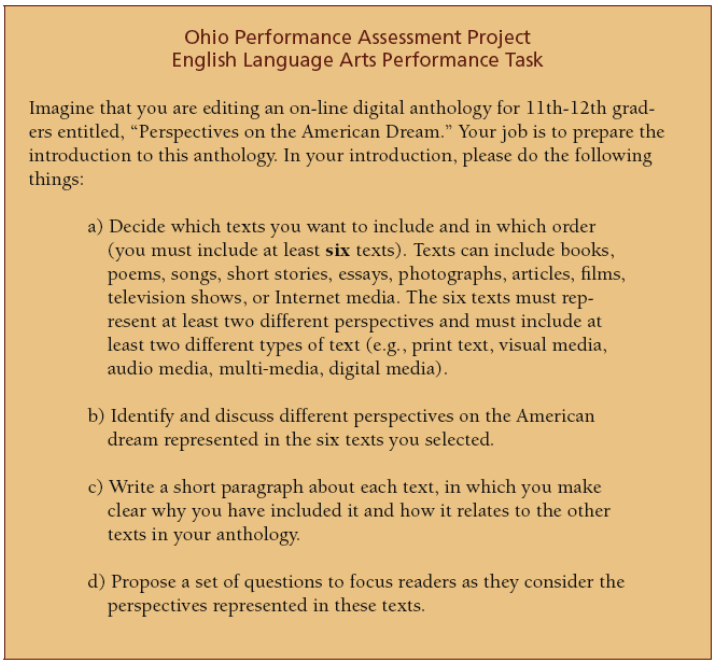
- It must be big enough for two adults to sleep in (with their baggage).
- It must be big enough for someone to move around in while kneeling down.
- The bottom of the tent will be made from a thick rectangle of plastic.
- The sloping sides and the two ends will be made from a single, large sheet of canvas. (It should be possible to cut the canvas so that the two ends do not need sewing onto the sloping sides. It should be possible to zip up the ends at night.)
- Two vertical tent poles will hold the whole tent up.

1. Estimate the relevant dimensions of a typical adult and write these down.

2. Estimate the dimensions you will need for the rectangular plastic base.
   Estimate the length of the vertical tent poles you will need.
   Explain how you get these measurements.

3. Draw a sketch to show how you will cut the canvas from a single piece.
   Show all the measurements clearly.
   Calculate any lengths or angles you don't know.
   Explain how you figured out these lengths and angles.

Figure 4. An example of a constructed response item from MARS



Ohio Performance Assessment Project
English Language Arts Performance Task

Imagine that you are editing an on-line digital anthology for 11th-12th graders entitled, "Perspectives on the American Dream." Your job is to prepare the introduction to this anthology. In your introduction, please do the following things:

a) Decide which texts you want to include and in which order (you must include at least **six** texts). Texts can include books, poems, songs, short stories, essays, photographs, articles, films, television shows, or Internet media. The six texts must represent at least two different perspectives and must include at least two different types of text (e.g., print text, visual media, audio media, multi-media, digital media).

b) Identify and discuss different perspectives on the American dream represented in the six texts you selected.

c) Write a short paragraph about each text, in which you make clear why you have included it and how it relates to the other texts in your anthology.

d) Propose a set of questions to focus readers as they consider the perspectives represented in these texts.

Figure 5. An example of an extended performance task

Led by Wisconsin in collaboration with the World-Class Instructional Design and Assessment (WIDA), the consortium Assessment Services Supporting English Learners through Technology Systems (ASSETS) is developing a summative language assessment tied to the Common Core designed specifically for English-language learners.

Timeline

Full implementation and assessment of the CCSSM is to occur in the 2014–2015 school year. All consortia are currently in the assessment design and development phase, with pilot and field testing planned for the 2012–2013 and 2013–2014 school years. Considering that the *Common Core State Standards Initiative* began in 2009, for these assessment systems to be fully operational by 2014–2015 is a fairly ambitious timeline. (ASSETS is scheduled to be operational by 2015–2016.) The now optional components of PARCC and SBAC were not originally conceived as such; however, as a result of a decreased time capacity there was an understandable need to scale back and alter plans. The actual assessments that do result from the consortia's work will be interesting to compare to the original proposals.

Conclusion

Will these next-generation assessments reflect revolutionary innovations or evolutionary shifts in testing? The assessment consortia, particularly PARCC and SBAC, propose some interesting changes to current tests: online administration, computer adaptive testing (CAT), computer scoring of short constructed response items, and inclusion of extended-time performance tasks. None of these ideas, however, offers an extraordinary transformation in testing. A handful of states (Delaware, Hawaii, Idaho, Kansas, and Oregon) already administer summative state assessments electronically (SETDA, 2011); SBAC is looking to Oregon for its "expertise" and experience with CAT. New York includes constructed response items on its assessments for grades 3–8 and the Regents exams. Goals of these next-generation assessments include helping to close the gap with NAEP and replacing higher education placement tests. Should the assessments truly accomplish these tasks, how truly revolutionary an achievement in educational testing this would be!

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