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технический университет им. А.Н. Туполева-КАИ»

Институт **Компьютерных технологий и защиты информации**

Кафедра **Компьютерных систем**

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ФОНД ОЦЕНОЧНЫХ СРЕДСТВ

для проведения промежуточной аттестации обучающихся по дисциплине
Деловой иностранный язык

Индекс по учебному плану: **Б1.Б.04**
Направление подготовки: **09.04.01 Информатика и вычислительная техника**
Квалификация: **магистр**
Магистерская программа: **Информационное и программное обеспечение автоматизированных систем**
Разработка и администрирование информационных систем
Разработчик-программист (информатика как вторая компетенция)
Системы автоматизированного проектирования (электронные средства)
Системы автоматизированного проектирования машиностроения
Компьютерный анализ и интерпретация данных
Системное и сетевое администрирование (информатика как вторая компетенция)
Исследования в области компьютерных и технических систем
Сети и телекоммуникации
Высокопроизводительные вычислительные системы
Элементы и устройства вычислительной техники и информационных систем
Интеллектуальные системы поддержки принятия решений
Вид профессиональной деятельности: **научно-исследовательская**

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Казань 2017 г.

Фонд оценочных средств для проведения промежуточной аттестации обучающихся по дисциплине Деловой иностранный язык

Содержание фонда оценочных средств (ФОС) соответствует требованиям федерального государственного стандарта высшего образования (ФГОС ВО) по направлению подготовки **09.04.01** «Информатика и вычислительная техника», и в соответствии с учебным планом направления **09.04.01** «Информатика и вычислительная техника».

Разработанные ФОС полностью соответствуют задачам будущей профессиональной деятельности обучающихся, установленных ФГОС ВО, представлены оценочные средства для проведения различных форм контроля, имеются разнообразные задания различного уровня сложности.

Заключение. Представленные материалы соответствуют требованиям ФГОС ВО по направлению подготовки **09.04.01** «Информатика и вычислительная техника», и рекомендуются для использования в учебном процессе.

Рассмотрено на заседании учебно-методической комиссии ИКТЗИ от «31» августа 2017г. протокол №8.

Председатель УМК _____В.Родионов

Содержание

Введение

Фонд оценочных средств для проведения промежуточной аттестации обучающихся по дисциплине (ФОС ПА) «*Деловой иностранный язык*» – это комплект методических и контрольно-измерительных материалов, предназначенных для определения уровня сформированности компетенций, оценивания знаний, умений, владений на разных этапах освоения дисциплины для проведения промежуточной аттестации обучающихся по дисциплине «Деловой иностранный язык».

ФОС ПА является составной частью учебного и методического обеспечения программы магистратуры по направлению подготовки 09.04.02 «Информационные системы и технологии».

Задачи ФОС по дисциплине «Деловой иностранный язык»:

– оценка запланированных результатов освоения дисциплиныобучающимися в процессе изучения дисциплины, в соответствии с разработанными и принятыми критериями по каждому виду контроля;

– контроль и управление процессом приобретения обучающимися необходимых знаний, умений, навыков и формирования компетенций, определенных в ФГОС ВО по направлению подготовки.

ФОС ПА по дисциплине «Деловой иностранный язык» сформирован на основе следующих основных принципов оценивания:

– пригодности (валидности) (объекты оценки соответствуют поставленным целям обучения);

– надежности (использования единообразных стандартов и критериев для оценивания запланированных результатов);

– эффективности (соответствия результатов деятельности поставленным задачам).

ФОС ПА по дисциплине «Деловой иностранный язык» разработан в соответствии с требованиями ФГОС ВО о направлению **09.04.01** «Информатика и вычислительная техника» для аттестации обучающихся на соответствие их персональных достижений требованиям поэтапного формирования соответствующих составляющих компетенций и включает контрольные вопросы (или тесты) и типовые задания, необходимые для оценки знаний, умений и навыков, характеризующих этапы формирования компетенций.

1 Формы промежуточной аттестации по дисциплине

Дисциплина «Деловой иностранный язык» изучается в 2 семестре при очной форме обучения и завершается промежуточной аттестацией в форме зачета.

2 Оценочные средства для промежуточной аттестации

Оценочные средства для промежуточной аттестации по дисциплине «Деловой иностранный язык» при очной форме обучения.

Таблица 1

Оценочные средств для промежуточной аттестации
(очная форма обучения)

№ п/п	Семестр	Форма промежуточной аттестации	Оценочные средства
1.	2	зачет	ФОС ПА

3 Перечень компетенций с указанием этапов их формирования в процессе освоения дисциплины

Перечень компетенций и их составляющих, которые должны быть сформированы при изучении темы соответствующего раздела дисциплины «Деловой иностранный язык», представлен в таблице 2.

Таблица 2

Перечень компетенций и этапы их формирования
в процессе освоения дисциплины

№ п/п	Этап формирования (семестр)	Наименование раздела	Код формируемой компетенции (составляющей компетенции)		Форма промежуточной аттестации
1.	2	Раздел 1. Деловое общение	ОК-7 ОПК-4	ОК-7.З, ОК-7.У, ОК-7.В, ОПК-4.З, ОПК-4.У, ОПК-4.В	зачет
2.	2	Раздел 2. Деловая переписка	ОК-7 ОПК-4	ОК-7.З, ОК-7.У, ОК-7.В, ОПК-4.З, ОПК-4.У, ОПК-4.В	зачет
3.	2	Раздел 3. Научные конференции	ОК-7 ОПК-4	ОК-7.З, ОК-7.У, ОК-7.В, ОПК-4.З, ОПК-4.У, ОПК-4.В	зачет

4 Описание показателей и критериев оценивания компетенций на различных этапах их формирования, описания шкалы оценивания

Показатели и критерии оценивания сформированности компетенций на зачете, приведены в таблице 3.

Таблица 3

Показатели и критерии оценивания сформированности компетенций на зачете

№ п/п	Этап формирования (сем)	Код формируемой компетенции (составляющей компетенции)		Критерии оценивания	Показатели оценивания (планируемые результаты обучения)		
					Пороговый уровень	Продвинутый уровень	Превосходный уровень
1.	2	ОК-7	ОК-7.З, ОК-7.У, ОК-7.В	Теоретические и практические навыки	Знание: основных принципов поиска информации для изучения языка самостоятельно с помощью информационных технологий на уровне узнавания и применения в стандартных (учебных) ситуациях. Умение: находить необходимую информацию и анализировать источники информации самостоятельно с использованием информационных технологий на уровне узнавания и применения в стандартных (учебных) ситуациях. Владение: навыками самостоятельного решения поставленных задач посредством информационных технологий на уровне узнавания и применения в стандартных (учебных) ситуациях.	Знание: основных принципов поиска информации для изучения языка самостоятельно с помощью информационных технологий на уровне продуктивного применения в типичных ситуациях Умение: находить необходимую информацию и анализировать источники информации самостоятельно с использованием информационных технологий на уровне продуктивного применения в типичных ситуациях. Владение: навыками самостоятельного решения поставленных задач посредством информационных технологий на уровне продуктивного применения в типичных ситуациях.	Знание: основных принципов поиска информации для изучения языка самостоятельно с помощью информационных технологий на уровне продуктивного применения в новых ситуациях Умение: находить необходимую информацию и анализировать источники информации самостоятельно с использованием информационных технологий на уровне продуктивного применения в новых ситуациях. Владение: навыками самостоятельного решения поставленных задач посредством информационных технологий на уровне продуктивного применения в новых ситуациях.

2.	2	ОПК-4	ОПК-4.З, ОПК-4.У, ОПК-4.В	Теоретические и практические навыки	Знание: важнейших лексико-грамматических и стилистических параметров языка на уровне узнавания и применения в стандартных (учебных) ситуациях. Умение: порождать адекватные в условиях конкретной ситуации общения устные и письменные тексты на уровне узнавания и применения в стандартных (учебных) ситуациях. Владение: различными приемами структурирования устного и письменного текста делового характера на иностранном языке на уровне узнавания и применения в стандартных (учебных) ситуациях.	Знание: важнейших лексико-грамматических и стилистических параметров языка на уровне продуктивного применения в типичных ситуациях Умение: порождать адекватные в условиях конкретной ситуации общения устные и письменные тексты на уровне продуктивного применения в типичных ситуациях. Владение: различными приемами структурирования устного и письменного текста делового характера на уровне продуктивного применения в типичных ситуациях.	Знание: важнейших лексико-грамматических и стилистических параметров языка на уровне продуктивного применения в новых ситуациях Умение: порождать адекватные в условиях конкретной ситуации общения устные и письменные тексты на уровне продуктивного применения в новых ситуациях. Владение: различными приемами структурирования устного и письменного текста делового характера на уровне продуктивного применения в новых ситуациях

Формирование оценки при промежуточной аттестации по итогам освоения дисциплины зависит от уровня освоения компетенций, которые обучающийся должен освоить по данной дисциплине. Связь между итоговой оценкой и уровнем освоения компетенций (шкала оценивания) представлена в таблице 4.

Таблица 4

Описание шкалы оценивания

Шкала оценивания		Описание оценки в требованиях к уровню и объему компетенций
Словесное выражение	Выражение в баллах	
Зачтено	от 86 до 100	Освоен **превосходный** уровень всех компетенций (составляющих компетенций)
Зачтено	от 71 до 85	Освоен **продвинутый** уровень всех компетенций (составляющих компетенций)
Зачтено	от 51 до 70	Освоен **пороговый** уровень всех компетенций (составляющих компетенций)
Не зачтено	до 51	Не освоен **пороговый** уровень всех компетенций (составляющих компетенций)

5 Методические материалы, определяющие процедуру оценивания знаний, умений, навыков и (или) опыта деятельности, характеризующих этапы формирования компетенций

Формирование оценки по результатам текущего контроля успеваемости и промежуточной аттестации по итогам освоения дисциплины «Деловой иностранный язык приведено в таблице 5.

Таблица 5

Формирование оценки по итогам освоения дисциплины (модуля) или практики

Наименование контрольного мероприятия	Рейтинговые показатели				
	I аттестация	II аттестация	III аттестация	по результатам текущего контроля	по итогам промежуточной аттестации (зачета /экзамена)
Раздел 1. Деловое общение	**15**			**15**	
Тест текущего контроля по разделу	10			10	
Составление активного словаря деловой лексики	5			5	
Раздел 2. Деловая переписка		**15**		**15**	
Тест текущего контроля по разделу		10		10	
Подготовка резюме		5		5	
Раздел 3. Научные конференции			**20**	**20**	
Тест текущего контроля по разделу			10	10	
Проверка языкового портфолио			10	10	
Промежуточная аттестация (зачет):					**50**
– тест промежуточной аттестации по дисциплине*					20
– в письменной форме по билетам					30

6 Контрольные задания или иные материалы, необходимые для оценки знаний, умений, навыков и (или) опыта деятельности, характеризующих этапы формирования компетенций в процессе освоения дисциплины.

6.1. Оценочные средства для промежуточного контроля:

Первый этап: тестовые задания.

Выберите правильный вариант ответа:

1. The force of gravitational attraction exerted on a body by the earth_____ as the weight of the body is one of the most important forces in everyday life.
know
knowing
known
knew

2. The total quantity of pure radium _____ is quite insignificant.
obtains
obtain
obtaining
obtained

3. Intermolecular space exists even in a gas which, _____ exceedingly high pressure ceases to contract its volume.
subjected to
subject to
subject
subjecting to

4. When used as an amplifier the radio-tube allows a small voltage _____ a strong flow of current from a battery.
to control
to controlled
controlling
to controls

5. If a body _____ in a fluid, the upthrust of the fluid on the body is equal to the weight of the fluid displaced.
is totally immerse
is totally immersed
is totally immersing
are totally immersed

6. Any moving object is able to do work, the quantity of kinetic energy _____ its mass and velocity.
depend on
depended on
depending on
depending

7. The temperature of a wire being raised, the random motion of the electrons _____.

increase
increases
increasing
being increased
8. The current flow _____, the direction of the magnetic lines of force also changed.
having been changed
having being changed
having be changed
have been changed
9. The molecules of a gas _____ about freely.
are moved
moving
are moving
is moving
10. _____ the volume, the pressure, and the temperature of the gas, we can determine the state of its mass.
Known
Knowing
Knows
Know
11. At the beginning of the century scientists succeeded in breaking the nucleus of the atom by attacking it with tiny particles_____with a great speed.
be flying
is flying
fly
flying
12. _____ in proper proportion hydrogen and oxygen combine forming water.
Be taken
Being taken
Being take
Be take
13. The ammeter is a _____ device.
measures
measured
measuring
was measuring
14. The forces _____between atoms within a molecule are very strong.
acts
to acting
actings
acting
15. When speaking of water, we must remember that it_____of tiny particles of its molecules.
are composed
is composed
is composes

composed
16. _____ by a snow storm, the liner was three days late.
Having detained
Been detained
Having been detained
Having being detained
17. In passing through a metal electrons _____with many ions.
collide
collides
colliding
is collide
18. When the boiling _____ the adding of heat does not raise the temperature.
is reached
is reach
is reaching
is been reached
19. The proper work of an engine _____upon its being well lubricated.
depend
depending
depends
was depended
20. All the chemical transformations that take place around us only change energy from one form into another without _____the total.
affect
affecting
affected
be affecting
21. Coal and any other fuel provide the heat _____ for driving our engines and turbines.
require
required
be required
have been required
22. In carrying out the plan of _____ an artificial satellite our scientists had to solve many difficult problems.
launch
be launching
launching
launches
23. The bridge _____ so quickly surprised us very much.
having repaired
having been repaired
have been repaired
has been repaired
24. _____ a new economic paradigm became a necessity when the traditional approach failed to explain the complexities of modern economy.
Created

Creating
Create
Creates
25. After _____ the households, business firms, government and private sector, one can proceed with the microeconomic analysis.
aggregating
aggregates
aggregatings
to aggregate

Второй этап: вопросы к комплексному заданию.

Билет № 1.
1. Составьте аннотацию к тексту, используя следующие выражения:
The article under review…
The article deals with a problem of…
At the beginning the author describes…/ analyses…/underlines…/ touches upon…
Then the author passes on to…/ gives a detailed description…
In conclusion the author…

How the brain can handle so much data
December 15, 2015 Georgia Institute of Technology

Humans learn to very quickly identify complex objects and variations of them. We generally recognize an "A" no matter what the font, texture or background, for example, or the face of a coworker even if she puts on a hat or changes her hairstyle. We also can identify an object when just a portion is visible, such as the corner of a bed or the hinge of a door. But how? Are there simple techniques that humans use across diverse tasks? And can such techniques be computationally replicated to improve computer vision, machine learning or robotic performance?
Researchers at Georgia Tech discovered that humans can categorize data using less than 1 percent of the original information, and validated an algorithm to explain human learning -- a method that also can be used for machine learning, data analysis and computer vision.
"How do we make sense of so much data around us, of so many different types, so quickly and robustly?" said Santosh Vempala, Distinguished Professor of Computer Science at the Georgia Institute of Technology and one of four researchers on the project. "At a fundamental level, how do humans begin to do that? It's a computational problem."
Researchers Rosa Arriaga, Maya Cakmak, David Rutter, and Vempala at Georgia Tech's College of Computing studied human performance in "random projection" tests to understand how well humans learn an object. They presented test subjects with original, abstract images and then asked whether they could correctly identify that same image when randomly shown just a small portion of it.
"We hypothesized that random projection could be one way humans learn," Arriaga, a senior research scientist and developmental psychologist, explains. "The short story is, the prediction was right. Just 0.15 percent of the total data is enough for humans."
Next, researchers tested a computational algorithm to allow machines (very simple neural networks) to complete the same tests. Machines performed as well as humans, which provides a new understanding of how humans learn. "We found evidence that, in fact, the human and the neural network behave very similarly," Arriaga said.
The researchers wanted to come up with a mathematical definition of what typical and atypical stimuli look like and, from that, predict which data would hardest for the human and the machine to

learn. Humans and machines performed equally, demonstrating that indeed one can predict which data will be hardest to learn over time.
Results were recently published in the journal Neural Computation (MIT press). It is believed to be the first study of "random projection," the core component of the researchers' theory, with human subjects.
To test their theory, researchers created three families of abstract images at 150 x 150 pixels, then very small ``random sketches'' of those images. Test subjects were shown the whole image for 10 seconds, then randomly shown 16 sketches of each. Using abstract images ensured that neither humans nor machines had any prior knowledge of what the objects were.
"We were surprised by how close the performance was between extremely simple neural networks and humans," Vempala said. "The design of neural networks was inspired by how we think humans learn, but it's a weak inspiration. To find that it matches human performance is quite a surprise."
"This fascinating paper introduces a localized random projection that compresses images while still making it possible for humans and machines to distinguish broad categories," said Sanjoy Dasgupta, professor of computer science and engineering at the University of California San Diego and an expert on machine learning and random projection. "It is a creative combination of insights from geometry, neural computation, and machine learning."
Although researchers cannot definitively claim that the human brain actually engages in random projection, the results support the notion that random projection is a plausible explanation, the authors conclude. In addition, it suggests a very useful technique for machine learning: large data is a formidable challenge today, and random projection is one way to make data manageable without losing essential content, at least for basic tasks such as categorization and decision making.
The algorithmic theory of learning based on random projection already has been cited more than 300 times and has become a commonly used technique in machine learning to handle large data of diverse types.

Задание 2. Устное высказывание по теме научной работы.

Билет № 2.
1. Составьте аннотацию к тексту, используя следующие выражения:
The article under review…
The article deals with a problem of…
At the beginning the author describes…/ analyses…/underlines…/ touches upon…
Then the author passes on to…/ gives a detailed description…
In conclusion the author…

Scientists teach machines to learn like humans
December 10, 2015 New York University

This paper compares human and machine learning for a wide range of simple visual concepts, or handwritten characters selected from alphabets around the world. This is an artist's interpretation of that theme. Art by Danqing Wang. This material relates to a paper that appeared in the Dec. 11, 2015 issue of Science, published by AAAS. The paper, by B.M. Lake at New York University in New York, NY, and colleagues was titled, "Human-level concept learning through probabilistic program induction."
A team of scientists has developed an algorithm that captures our learning abilities, enabling computers to recognize and draw simple visual concepts that are mostly indistinguishable from those created by humans. The work, which appears in the latest issue of the journal Science, marks a significant advance in the field -- one that dramatically shortens the time it takes computers to 'learn' new concepts and broadens their application to more creative tasks.
"Our results show that by reverse engineering how people think about a problem, we can develop better algorithms," explains Brenden Lake, a Moore-Sloan Data Science Fellow at New York

University and the paper's lead author. "Moreover, this work points to promising methods to narrow the gap for other machine learning tasks."
The paper's other authors were Ruslan Salakhutdinov, an assistant professor of Computer Science at the University of Toronto, and Joshua Tenenbaum, a professor at MIT in the Department of Brain and Cognitive Sciences and the Center for Brains, Minds and Machines.
When humans are exposed to a new concept -- such as new piece of kitchen equipment, a new dance move, or a new letter in an unfamiliar alphabet -- they often need only a few examples to understand its make-up and recognize new instances. While machines can now replicate some pattern-recognition tasks previously done only by humans -- ATMs reading the numbers written on a check, for instance -- machines typically need to be given hundreds or thousands of examples to perform with similar accuracy.
"It has been very difficult to build machines that require as little data as humans when learning a new concept," observes Salakhutdinov. "Replicating these abilities is an exciting area of research connecting machine learning, statistics, computer vision, and cognitive science."
Salakhutdinov helped to launch recent interest in learning with 'deep neural networks,' in a paper published in Science almost 10 years ago with his doctoral advisor Geoffrey Hinton. Their algorithm learned the structure of 10 handwritten character concepts -- the digits 0-9 -- from 6,000 examples each, or a total of 60,000 training examples.
In the work appearing in Science this week, the researchers sought to shorten the learning process and make it more akin to the way humans acquire and apply new knowledge -- i.e., learning from a small number of examples and performing a range of tasks, such as generating new examples of a concept or generating whole new concepts.
To do so, they developed a 'Bayesian Program Learning' (BPL) framework, where concepts are represented as simple computer programs. For instance, the letter 'A' is represented by computer code -- resembling the work of a computer programmer -- that generates examples of that letter when the code is run. Yet no programmer is required during the learning process: the algorithm programs itself by constructing code to produce the letter it sees. Also, unlike standard computer programs that produce the same output every time they run, these probabilistic programs produce different outputs at each execution. This allows them to capture the way instances of a concept vary, such as the differences between how two people draw the letter 'A.'
While standard pattern recognition algorithms represent concepts as configurations of pixels or collections of features, the BPL approach learns "generative models" of processes in the world, making learning a matter of 'model building' or 'explaining' the data provided to the algorithm. In the case of writing and recognizing letters, BPL is designed to capture both the causal and compositional properties of real-world processes, allowing the algorithm to use data more efficiently. The model also "learns to learn" by using knowledge from previous concepts to speed learning on new concepts -- e.g., using knowledge of the Latin alphabet to learn letters in the Greek alphabet. The authors applied their model to over 1,600 types of handwritten characters in 50 of the world's writing systems, including Sanskrit, Tibetan, Gujarati, Glagolitic -- and even invented characters such as those from the television series Futurama.
In addition to testing the algorithm's ability to recognize new instances of a concept, the authors asked both humans and computers to reproduce a series of handwritten characters after being shown a single example of each character, or in some cases, to create new characters in the style of those it had been shown. The scientists then compared the outputs from both humans and machines through 'visual Turing tests.' Here, human judges were given paired examples of both the human and machine output, along with the original prompt, and asked to identify which of the symbols were produced by the computer.
While judges' correct responses varied across characters, for each visual Turing test, fewer than 25 percent of judges performed significantly better than chance in assessing whether a machine or a human produced a given set of symbols.
"Before they get to kindergarten, children learn to recognize new concepts from just a single example, and can even imagine new examples they haven't seen," notes Tenenbaum. "I've wanted to

build models of these remarkable abilities since my own doctoral work in the late nineties. We are still far from building machines as smart as a human child, but this is the first time we have had a machine able to learn and use a large class of real-world concepts -- even simple visual concepts such as handwritten characters -- in ways that are hard to tell apart from humans."
The work was supported by grants from the National Science Foundation to MIT's Center for Brains, Minds and Machines (CCF-1231216), the Army Research Office (W911NF-08-1-0242, W911NF-13-1-2012), the Office of Naval Research (N000141310333), and the Moore-Sloan Data Science Environment at New York University.

Задание 2. Устное высказывание по теме научной работы.

Билет № 3.
1. Составьте аннотацию к тексту, используя следующие выражения:
The article under review…
The article deals with a problem of…
At the beginning the author describes…/ analyses…/underlines…/ touches upon…
Then the author passes on to…/ gives a detailed description…
In conclusion the author…

How does my therapist rate?
December 2, 2015 University of Southern California

"And how does that make you feel? Empathy is the foundation of therapeutic intervention. But how can you know if your therapist is or will be empathetic? Technology developed by researchers from USC, University of Washington, and the University of Utah can tell you.
Leveraging developments in automatic speech recognition, natural language processing and machine learning, researchers Bo Xiao (Ming Hsieh Department of Electrical Engineering at the USC Viterbi School of Engineering), Zac E. Imel (Department of Educational Psychology at the University of Utah), Panayiotis G. Georgiou (Ming Hsieh Department of Electrical Engineering at the USC Viterbi School of Engineering), David C. Atkins (Department of Psychiatry and Behavioral Sciences at the University of Washington) and Shrikanth S. Narayanan (Ming Hsieh Department of Electrical Engineering at the USC Viterbi School of Engineering), developed software to detect "high-empathy" or "low-empathy" speech by analyzing more than 1,000 therapist-patient sessions. The researchers designed a machine-learning algorithm that takes speech as its input to generate an empathy score for each session automatically.
Their methodology is documented in a forthcoming article titled, "'Rate My Therapist': Automated Detection of Empathy in Drug and Alcohol Counseling via Speech and Language Processing," and according to the authors, is the first study of its kind to record therapy sessions and automatically determine the quality of a therapy session based on a single characteristic. The study appears in the December issue of PLoS ONE.
Currently, there are very few ways to assess the quality of a therapy session. In fact, according the researchers, the methods for evaluating therapy have remained unchanged for seventy years. Methods requiring third-party human evaluators are time-consuming and affect the privacy of each session.
Instead, imagine a natural language processing app like SIRI listening in for the right phrases and vocal qualities. The researchers are building on a emerging a new field in engineering and computer science called behavioral signal processing, which "utilizes computational methods to assist in human decision-making about behavioral phenomena."
The authors taught their algorithm to recognize empathy via data from training sessions for therapists, specifically looking at therapeutic interactions with individuals coping with addiction and alcoholism. Using automatic speech recognition and machine learning based models, the

algorithm then automatically identified select phrases that would indicate whether a therapist demonstrated high or low empathy.
Key phrases such as: "it sounds like," "do you think," and "what I'm hearing," indicated high empathy, while phrases such as "next question," "you need to," and "during the past," were perceived as low-empathy by the computational model.
Speaking about this innovation Shri Narayanan, Andrew J. Viterbi Professor of Engineering at USC and the senior author on this study, said, "Technological advances in human behavioral signal processing and informatics promise not only scale up and provide cost savings through automation of processes that are typically manual, but enable new insights by offering tools for discovery. This particular study gets at a hidden mental state and what this shows is that computers can be trained to detect constructs like empathy using observational data."
Narayanan's team in the Signal Analysis and Interpretation Lab at USC continues to develop more advanced models -- giving the algorithm the capacity to analyze diction, the tone of voice, the musicality of one's speech (prosody) as well as how the cadence of one speaker in conversation is echoed with another (for example when a person talks fast and the listener's oral response mirrors the rhythm with quick speech).
In the near term, the researchers are hoping to use this tool to train aspiring therapists.
"Being able to assess the quality of psychotherapy is critical to ensuring that patients receive quality treatment, said David Atkins, a University of Washington research professor of psychiatry.." ..The sort of technology our team of engineers and psychologists is developing may offer one way to help providers get immediate feedback on what they are doing -- and ultimately improve the effectiveness of mental health care," said Zac Imel, a University of Utah professor of educational psychology and the paper's corresponding author.
In the long run, the team hopes to create software that provides real-time feedback or rates a therapy session on the spot. In addition, the researchers want to incorporate additional elements into their empathy rating algorithm, including acoustic channels and the frequency with which a therapist or patient speaks.

Задание 2. Устное высказывание по теме научной работы.

Бидет № 4.
1. Составьте аннотацию к тексту, используя следующие выражения:
The article under review…
The article deals with a problem of…
At the beginning the author describes…/ analyses…/underlines…/ touches upon…
Then the author passes on to…/ gives a detailed description…
In conclusion the author…

Online game reveals something fishy about mathematical models
December 2, 2015 Uppsala University

How can you tell if your mathematical model is good enough? In a new study, researchers from Uppsala University implemented a Turing test in the form of an online game (with over 1700 players) to assess how good their models were at reproducing collective motion of real fish schools. The results are published in Biology Letters.
Mathematical models allow us to understand how patterns and processes in the real world are generated and how complex behaviour, such as the collective movement of animal groups, can be produced from simple individual level rules. Fitting models based on the large scale properties of the data is one way to choose between different models, but can we be satisfied with our model when this has been achieved? How can we apply other methods to see how good our model fit is?

James Herbert-Read, researcher at the Department of Mathematics at Uppsala University, and his colleagues highlight and propose a solution to this problem by implementing a Turing test to assess how good their models were at reproducing collective motion.
They designed an online game where members of the public (over 1700 players online) and a small group of experts were asked to differentiate between the collective movements of real fish schools and those simulated by a model.
'By putting the game online, and though crowd sourcing this problem, the public have not only become engaged in science, they have also helped our research,' says James Herbert-Read.
Even though the statistical properties of the model matched those of the real data, both experts and members of the public could differentiate between simulated and real fish. The researchers asked the online players that answered all six questions correctly to give feedback on how they differentiated between the real schools and the simulated ones.
'These players commonly suggested that the spatial organization of the groups and smoothness of the trajectories appeared different between the simulated and real schools. These are aspects of the model we can try to improve in the future', says James Herbert-Read.
'Our results highlight that we can use ourselves as Mechanical Turks through 'citizen science' to improve and refine model fitting'.
Alan Turing provided a means of assessing whether a machine's behaviour was equivalent or indistinguishable from that of a human. In the Turing test, if a human observer could not determine between which one of two interacting players was a machine (the other a human), then the machine had passed the test and exhibited intelligent behaviour. The test is designed to assess the ability of a model (the machine) to reproduce the real world (human behaviour).

Задание 2. Устное высказывание по теме научной работы.

Билет № 5.
1. Составьте аннотацию к тексту, используя следующие выражения:
The article under review…
The article deals with a problem of…
At the beginning the author describes…/ analyses…/underlines…/ touches upon…
Then the author passes on to…/ gives a detailed description…
In conclusion the author…

Network analysis shows systemic risk in mineral markets
November 13, 2015 International Institute for Applied Systems Analysis

A shortage of a rare mineral could spur global market instabilities, according to a new analysis of international commodity trade networks.
Shortages of natural resources--minerals such as copper, aluminum, and mercury--could lead to cascading shocks and lead to instabilities in the global trade system, according to a study published today in the journal Science Advances.
Mineral resources are increasingly important in the production of modern devices such as mobile phones and medical technologies. These resources are mined and shipped around the world through increasingly interlinked global trade networks.
"Regional shortages of minerals necessary for the manufacture of modern technologies could ripple throughout the trade system, leading to a sharp increase in the price volatility of such minerals in the global markets," says Peter Klimek, a researcher at the Medical University of Vienna, who led the study in collaboration with IIASA researchers.
The study examined trade flows of 71 mineral commodities between 107 countries, using a new method to assess the systemic risk in commodity trade networks.

It shows that minerals that are produced as a byproducts of other processes--for example rare earth metals produced as a byproduct of phosphorus mining for fertilizer--are the most susceptible to price volatility leading to systemic instabilities,
"The beauty of this methodology is that it allows the data to tell its own story," says IIASA Ecosystems Services and Management Program Director Michael Obersteiner. The new study grew out of a conversation with IIASA Advanced Systems Analysis researcher Stefan Thurner, who has previously applied similar methods to the study of systemic risk in financial markets.
"Commodity markets, like financial markets, are highly international and interconnected," explains Thurner. "Understanding these networks gives us a handle to explain and possibly predict a large portion of the instabilities in terms of price volatility in the markets."
In particular the study finds shortcomings in the management of non-fuel mineral resources that increase the systemic risk, and provides a method for countries to assess their resilience with respect to such rippling network effects. It proposes policy measures, for example a tax based on commodity risk that could create more stable markets.
The researchers plan to continue their collaboration, extending the methodology to explore other networked systems, for example the agriculture system, food trade, and food security.

Задание 2. Устное высказывание по теме научной работы.

Билет № 6.
1. Составьте аннотацию к тексту, используя следующие выражения:
The article under review…
The article deals with a problem of…
At the beginning the author describes…/ analyses…/underlines…/ touches upon…
Then the author passes on to…/ gives a detailed description…
In conclusion the author…

'Shrinking bull's-eye' algorithm speeds up complex modeling from days to hours
November 17, 2015 Massachusetts Institute of Technology

To work with computational models is to work in a world of unknowns: Models that simulate complex physical processes -- from Earth's changing climate to the performance of hypersonic combustion engines -- are staggeringly complex, sometimes incorporating hundreds of parameters, each of which describes a piece of the larger process.
Parameters are often question marks within their models, their contributions to the whole largely unknown. To estimate the value of each unknown parameter requires plugging in hundreds, if not thousands, of values, and running the model each time to narrow in on an accurate value -- a computation that can take days, and sometimes weeks.
Now MIT researchers have developed a new algorithm that vastly reduces the computation of virtually any computational model. The algorithm may be thought of as a shrinking bull's-eye that, over several runs of a model, and in combination with some relevant data points, incrementally narrows in on its target: a probability distribution of values for each unknown parameter.
With this method, the researchers were able to arrive at the same answer as a classic computational approaches, but 200 times faster.
Youssef Marzouk, an associate professor of aeronautics and astronautics, says the algorithm is versatile enough to apply to a wide range of computationally intensive problems.
"We're somewhat flexible about the particular application," Marzouk says. "These models exist in a vast array of fields, from engineering and geophysics to subsurface modeling, very often with unknown parameters. We want to treat the model as a black box and say, 'Can we accelerate this process in some way?' That's what our algorithm does."

Marzouk and his colleagues -- recent PhD graduate Patrick Conrad, Natesh Pillai from Harvard University, and Aaron Smith from the University of Ottawa -- have published their findings this week in the Journal of the American Statistical Association.

In working with complicated models involving multiple unknown parameters, computer scientists typically employ a technique called Markov chain Monte Carlo (MCMC) analysis -- a statistical sampling method that is often explained in the context of the board game 'Monopoly.'

To plan out a monopoly, you want to know which properties players land on most often -- essentially, an unknown parameter. Each space on the board has a probability of being landed on, determined by the rules of the game, the positions of each player, and the roll of two dice. To determine the probability distribution on the board -- the range of chances each space has of being landed on -- you could roll the die hundreds of times.

If you roll the die enough times, you can get a pretty good idea of where players will most likely land. This, essentially, is how an MCMC analysis works: by running a model over and over, with different inputs, to determine a probability distribution for one unknown parameter. For more complicated models involving multiple unknowns, the same method could take days to weeks to compute an answer.

With their new algorithm, Marzouk and his colleagues aim to significantly speed up the conventional sampling process.

"What our algorithm does is short-circuits this model and puts in an approximate model," Marzouk explains. "It may be orders of magnitude cheaper to evaluate."

The algorithm can be applied to any complex model to quickly determine the probability distribution, or the most likely values, for an unknown parameter. Like the MCMC analysis, the algorithm runs a given model with various inputs -- though sparingly, as this process can be quite time-consuming. To speed the process up, the algorithm also uses relevant data to help narrow in on approximate values for unknown parameters.

In the context of 'Monopoly,' imagine that the board is essentially a three-dimensional terrain, with each space represented as a peak or valley. The higher a space's peak, the higher the probability that space is a popular landing spot. To figure out the exact contours of the board -- the probability distribution -- the algorithm rolls the die at each turn and alternates between using the computationally expensive model and the approximation. With each roll of the die, the algorithm refers back to the relevant data and any previous evaluations of the model that have been collected.

At the beginning of the analysis, the algorithm essentially draws large, vague bull's-eyes over the board's entire terrain. After successive runs with either the model or the data, the algorithm's bull's-eyes progressively shrink, zeroing in on the peaks in the terrain -- the spaces, or values, that are most likely to represent the unknown parameter.

The group tested the algorithm on two relatively complex models, each with a handful of unknown parameters. On average, the algorithm arrived at the same answer as each model, but 200 times faster.

"What this means in the long run is, things that you thought were not tractable can now become doable," Marzouk says. "For an intractable problem, if you had two months and a huge computer, you could get some answer, but you would not necessarily know how accurate it was. Now for the first time, we can say that if you run our algorithm, you can guarantee that you'll find the right answer, and you might be able to do it in a day. Previously that guarantee was absent."

Marzouk and his colleagues have applied the algorithm to a complex model for simulating movement of sea ice in Antarctica, involving 24 unknown parameters, and found that the algorithm is 60 times faster arriving at an estimate than current methods. He plans to test the algorithm next on models of combustion systems for supersonic jets.

"This is a super-expensive model for a very futuristic technology," Marzouk says. "There might be hundreds of unknown parameters, because you're operating outside the normal regime. That's exciting to us."

This research was supported, in part, by the Department of Energy.

Задание 2. Устное высказывание по теме научной работы.

Билет №7.
1. Составьте аннотацию к тексту, используя следующие выражения:
The article under review…
The article deals with a problem of…
At the beginning the author describes…/ analyses…/underlines…/ touches upon…
Then the author passes on to…/ gives a detailed description…
In conclusion the author…

New breakthroughs for fundamental problems in computer science
October 19, 2015 University of Bristol

Academics from the University of Bristol will present new breakthroughs on two fundamental problems in Computer Science. These results will be presented at the world's leading international conference in computer science this week.
The 56th annual IEEE symposium on Foundations of Computer Science (FOCS 2015) will take place in California from Oct. 18-20 .
One of the most challenging questions in computer science is whether there exist problems that are provably hard to solve. This is most famously shown in an unsolved computer science question of whether P=NP, for which anyone who solves the problem would be awarded a prize of $1,000,000.
In the first paper, New unconditional hardness results for dynamic and online problems, Dr Raphaël Clifford, Reader in Algorithm Design in the University's Department of Computer Science and colleagues from Aarhus University, have proved hardness results for versions of matrix vector multiplication, a fundamental tool in much of applied mathematics. The researchers go on to show further hardness results for problems where the data are dynamically changing.
The research team have studied the cell probe complexity of two fundamental problems: matrix-vector multiplication and a version of dynamic set disjointness known as Patrascu's Multiphase Problem. The researchers have presented improved unconditional lower bounds for these problems as well as introducing new proof techniques of independent interest. These include a technique capable of proving strong threshold lower bounds of the following form: If we insist on having a very fast query time, then the update time has to be slow enough to compute a lookup table with the answer to every possible query. This is the first time a lower bound of this type has been proven.
The lower bounds the researchers have proved equal the highest that have ever been achieved and give the second ever example of such a mathematical proof that holds even when a potential solution is allowed to use random numbers.
In the second paper, Constructing linear-sized spectral sparsification in almost-linear time, Dr He Sun, Lecturer in Computer Science in the University's Department of Computer Science and Yin Tat Lee, a PhD student from MIT, have presented the first algorithm for constructing linear-sized spectral sparsifiers that runs in almost-linear time.
More and more applications from today's big data scenario need to deal with graphs of millions of vertices. While traditional algorithms can be applied directly in these massive graphs, these algorithms are usually too slow to be practical when the graph contains millions of vertices. Also, storing these practical massive graphs are very expensive.
Dr He Sun said: "Over the past decade, there have been intensive studies in order to overcome these two bottlenecks. One notable approach is through the intermediate step called spectral sparsification, which is the approximation of any input graph by a very sparse graph that inherits many properties of the input graph. Since most algorithms run faster in sparse graphs, spectral sparsification is used as a key intermediate step in speeding up the runtime of many practical graph algorithms, including finding approximate maximum flows in an undirected graph, and approximately solving linear systems, among many others."

Using spectral sparsification, the researchers ran many algorithms in a sparse graph, and obtained approximately the correct results as well. This general framework allowed them to speed up the runtime of a wide range of algorithms by a magnitude. However, to make the overall approach practical, a key issue was to find faster constructions of spectral sparsification with fewer edges in the resulting sparsifiers. There have been many studies looking at this area in the past decade.
The researchers have proved that, for any graph, they can construct in almost-linear time its spectral sparsifier, and in the output sparsifier every vertex has only constant number of vertices. This result is almost optimal respect to time complexity of the algorithm, and the number of edges in the spectral sparsifier.

Задание 2. Устное высказывание по теме научной работы.

Билет №8.
1. Составьте аннотацию к тексту, используя следующие выражения:
The article under review…
The article deals with a problem of…
At the beginning the author describes…/ analyses…/underlines…/ touches upon…
Then the author passes on to…/ gives a detailed description…
In conclusion the author…

Crunching numbers: Math equations help build optimal bird wing
September 28, 2015 Florida State University

If you had to design a bird or dolphin drone from scratch, how would you build the wings?
That's the question that Florida State University Assistant Professor of Mathematics Nick Moore posed in a new paper published by the academic journal Physics of Fluids.
Specifically, he wanted to know how flexible the wings or fins should be, so that if an engineer designed a flying or swimming drone, they could create the most effective one possible.
"We want to understand how wings and fins perform differently when they are made of flexible material," Moore said. "Sometimes, flexibility can really boost performance, but too much flexibility can be a bad thing. We want to find the happy medium."
Furthermore, Moore wanted to see if allowing the wing to be more flexible in certain places could help even more. He found that concentrating flexibility near the front of the wing, while keeping the back rigid, maximizes its capability to thrust forward when it is flapped.
In fact, a wing designed in this way generates 36 percent more thrust than one for which the flexibility is constant throughout.
Moore said the mathematical model aids in the fundamental understanding of how birds, insects and some amphibians are designed from a biological perspective. But the practical advantages for engineers designing robots are even greater.
"Maybe engineers will look at this as a way to improve designs," he said. "If you can control exactly how to build a flapping wing, this is how you should do it."
Drones are being used in all sorts of ways, from construction design to military endeavors to search and rescue operations.
To perform the calculations, Moore used partial differential equations that were solved on an ordinary computer.
In the beginning, Moore manually chose the wing designs that were put through the computer to be tested.
Ultimately, though, he developed an algorithm that allowed the computer to suggest its own guesses, and this was used to pin down the optimal design.
Much of the advanced mathematics conducted in the world right now requires super computers, but Moore takes a different approach. He used relatively simple equations so that designers with a math or engineering background could replicate the work.

"I like to spend more energy simplifying the mathematics as much as possible, so that the calculations can be run on a desktop, or even a laptop, in a reasonable amount of time," he said.

Задание 2. Устное высказывание по теме научной работы.

Билет №9.
1. Составьте аннотацию к тексту, используя следующие выражения:
The article under review…
The article deals with a problem of…
At the beginning the author describes…/ analyses…/underlines…/ touches upon…
Then the author passes on to…/ gives a detailed description…
In conclusion the author…

Math and me: Children who identify with math get higher scores
September 30, 2015 University of Washington

How strongly children identify with math (their math "self-concept") can be used to predict how high they will score on a standardized test of math achievement, according to a new study by researchers at the University of Washington.
The study, published in the October 2015 issue of the journal Learning and Instruction, is the first to demonstrate a link between students' subconscious math self-concepts and their actual math achievement scores.
The study also measured the strength of students' stereotype that "math is for boys" and found that, for girls, the stronger this subconscious stereotype, the weaker the individual child's math self-concept.
"Our results show that stereotypes are related to how children think of themselves as math learners, which, in turn, is related to how well they do on an actual math test," said lead author Dario Cvencek, a research scientist at the UW's Institute for Learning & Brain Sciences (I-LABS).
With co-author Andrew Meltzoff, co-director of I-LABS, Cvencek examined math-gender stereotypes, math self-concepts and math scores in 300 children (an even mix of boys and girls) in grades 1, 3, and 5 in Singapore.
The researchers chose Singapore, because it -- and other Asian countries including Japan and China -- is consistently ranked as one of the top nations in the world for math achievement among girls and boys.
The researchers focused on a high-achieving culture where there aren't gender differences in math ability, so that they could see which psychological factors have a role in student performance.
"We were fascinated to find that elementary-school children have subconscious thoughts about whether or not they are a math person," Meltzoff said. "They have an implicit identity of 'me is math' or 'me is not math.' This self-concept matters because it is correlated with actual behavior, such as math achievement."
At the beginning of the children's school year, the researchers led each child through an assortment of tasks measuring the students' beliefs about math-gender stereotypes ("math is for boys") and math-self concepts ("math is for me").
A Child Implicit Association Test (IAT) examined the children's subconscious beliefs. The IAT probes self-concepts, stereotypes and other attitudes that people may not know they have. Adult versions of IAT reveal hidden beliefs about gender, race, religion and other topics.
The researchers also used self-reported tasks to measure the children's explicit beliefs. These tasks involved the children looking at a series of drawings of boys and girls and then answering questions such as how much the characters in the drawings liked math.
Then, at the end of the school year, the students took a standardized math achievement test administered by their teachers.

Girls and boys performed well on the math test and had similar scores. But when the researchers factored in math-gender stereotype and math self-concept beliefs, they discovered that the children's implicit -- but not explicit -- beliefs affected math scores.
In both genders, students with stronger implicit math self-concepts did better on the math test. Stronger implicit math-gender stereotypes correlated with stronger math self-concepts for boys, but weaker math self-concepts for girls.
"We've found that there are implicit psychological factors, such as students' beliefs about math, that can weaken students' identification with math and also impair their math performance," Cvencek said.
And since the factors are implicit and not detectable by self-report measures, this means they can affect student performance without students' being aware of them.
Previously, Cvencek and Meltzoff found that as early as second grade children in the U.S. begin to express the cultural stereotype that "math is for boys, not for girls," which may discourage girls from pursuing math.
The researchers plan to use the findings to design ways to identify implicit math self-concepts as they emerge early in elementary school and create interventions to change beliefs that could be detrimental to math performance.
"We have high hopes for the usefulness of our tests," Cvencek said. "We think it could be useful for teachers and parents to know whether their young child identifies positively or negatively with math. If we can boost children's math self-concepts early in development, this may also help boost their actual math achievement and interest in the discipline. We plan to test this."
Manu Kapur from the National Institute of Education in Singapore is another co-author of the study.
The National Science Foundation, the Singaporean Ministry of Education and the UW funded the research.

Задание 2. Устное высказывание по теме научной работы.

Билет №10.
1. Составьте аннотацию к тексту, используя следующие выражения:
The article under review…
The article deals with a problem of…
At the beginning the author describes…/ analyses…/underlines…/ touches upon…
Then the author passes on to…/ gives a detailed description…
In conclusion the author…

The science of retweets
October 6, 2015 University of Maryland

What's the best time to tweet, to ensure maximum audience engagement? Researchers at the University of Maryland have demonstrated that an algorithm that takes into account the past activity of each of your followers -- and makes predictions about future tweeting -- can lead to more "retweets" than other commonly used methods, such as posting at peak traffic times.
The internet is full of advice about when to tweet to gain maximum exposure, but the new study subjects marketing folk wisdom to scientific scrutiny.
William Rand, director of the Center for Complexity in Business in UMD's Robert H. Smith School of Business, with co-authors from the departments of scientific computation and physics, examined the retweeting patterns of 15,000 Twitter followers during two different five week intervals, in 2011 and 2012, from 6 a.m. to 10 p.m. Retweets are especially valuable to marketers because they help to spread a brand's message beyond core followers.
Most marketers are well aware there's a pattern to Twitter traffic. In the early morning, nothing much happens. Then people get into work and retweet intensely, as they do their morning surfing.

The number of retweets drops as the day progresses, with a slight uptick at 5 p.m. Then it picks up again later "when people get back to their computers after dinner, or are out at a bar or restaurant using their phones," as Rand puts it. Monday through Friday follow roughly that pattern, but Saturday and Sunday show markedly different behavior, with much smaller morning spikes and less decline during the day.

A "seasonal" model of posting -- the folk-wisdom model -- would suggest posting whenever there are peaks in that recurring weekly pattern. (Which peaks you choose would depend how many tweets you expect to send.)

The authors compared that model to two others: The first added to the seasonal model a component that looked for unusual surges and declines (caused by, say, big news events) and adjusted posting patterns correspondingly. They built the final model from scratch: It took into account the individual tweeting behavior of each follower and predicted his or her likelihood of tweeting in the next 10 minutes.

The authors first had to write software that collected the tweets. For each five-week period studied, the authors used the first four weeks to build a model and the final week for testing it, by tweeting and watching what happened.

All three models were reasonably effective, but the algorithm that the authors wrote, which took each individual's behavior into account, was the most successful at generating retweets. The paper serves as a demonstration that applying analytic methods to Twitter data can improve a brand's ability to spread its message. The authors made the open-source software developed for the study available online.

Задание 2. Устное высказывание по теме научной работы.

Лист регистрации изменений и дополнений

№ п/п	№ страницы внесения изменений	Дата внесения изменения	Краткое содержание изменений (основание)	Ф.И.О., подпись	«Согласовано» заведующий кафедрой, ведущей дисциплину