ANGLAIS

Semestre 1

Année universitaire 2013-2014
Semestre ☒ 1 ☐ 2
Session ☒ 1 ☐ 2

UNIVERSITÉ DE NANTES

U.F.R. des Sciences et des Techniques

S.E.V.E. Bureau des Examens

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Reportez votre **NUMERO D'ANONYMAT** sur chaque feuillet

Numéro d'Anonymat : .....

I. Reading comprehension:

Meet the men who spy on women through their webcams

Adapted from *ars technica*, 11 March 13 by Nate Anderson

"See! That shit keeps popping up on my fucking computer!" says a blond woman as she leans back on a couch. The woman is visible from thousands of kilometres away on a hacker's computer. The hacker has infected her machine with a remote administration tool (RAT) that gives him access to the woman's screen, webcam, files, microphone.

RAT operators have nearly complete control over the computers they infect; they can (and do) browse people's private pictures in search of erotic images to share with each other online. They even have strategies for watching where women store the photos most likely to be compromising.

Women who have this done to them, especially when the spying escalates into blackmail, report feeling paranoia.

For many ratters, though, the spying remains little more than a game. It might be an odd hobby, but it's apparently no big deal to invade someone's machine, rifle through the personal files, and watch them silently from behind their own screens.

Welcome to the weird world of the ratters. They operate quite openly online, sharing the best techniques for picking up new female "slaves" in public forums.

How it's done

RAT tools aren't new; the hacker group Cult of the Dead Cow famously released an early one called BackOrifice at the Defcon hacker convention in 1998. The Cult of the Dead Cow press release made clear that BackOrifice was meant to expose "Microsoft's Swiss cheese approach to security." Compared to today's tools, BackOrifice was primitive. It could handle the basics, though: logging keystrokes, restarting the target machine, transferring files between computers, and snapping screenshots of the target computer.

Today, a cottage industry exists to build sophisticated RAT tools with names like DarkComet and BlackShades and to install and administer them on dozens or even hundreds of remote computers. When anti-malware vendors began to detect and clean these programs from infected computers, the RAT community built "crypters" to disguise the target code further. Today, serious ratters seek software that is currently "FUD" -- fully undetectable.

Building an army of slaves isn't particularly complicated; ratters simply need to trick their targets into running a file. This is commonly done by seeding file-sharing networks with infected files and naming them after popular songs or movies. For those who can't even manage this on their own, RAT experts hawk their slave-infecting expertise in e-books. And if even this handholding isn't enough, more successful ratters sometimes rent out slaves they have already infected. In other cases, they simply hand them off to others in a "Free Girl Slave Giveaway."

Calling most of these guys "hackers" does a real disservice to hackers everywhere; only minimal technical skill is now required to deploy a RAT and acquire slaves. Once infected, all the common RAT software provides a control panel view in which one can see all current slaves, their locations, and the status of their machines. With a few clicks, the operator can start watching the screen or webcam of any slave currently online.

The process is now simple enough that some ratters engage in it without knowing how RATs really work or even how vulnerable they are to being caught. Back in 2010, one Hack Forums member entered the RAT subforum worried about going to jail. "LOL, don't worry you ain't going to jail," another member responded. This is probably true; few such ratters are ever found.

All Most information is good information

Regardless of legality why would anyone want to host such content? I put the question to Jesse LaBrocca, the Las Vegas-based creator and operator of Hack Forums, which is one of the largest public hacker-focused sites anywhere. (Serious criminals, of course, prefer private forums that require vetting to enter -- which is one reason that law enforcement creates such sites when it wants to catch them.)

He responded with a strong defence of the idea that information should be open to all and he pointed to the Wikipedia entry on keyloggers to illustrate his point. "It's a fair amount of information including functions in Windows you would hook into to use a keylogger," he told me by e-mail. "At what point does Wikipedia and the Internet community decide it's too much information? And is there actually such a thing as 'too much information?'"

Possibly not, but my question wasn't about the existence of a forum devoted to RATs or to technical discussion about them. It was about the fact that the RAT subforum is *filled* with posts in which people explicitly show that they have illegally invaded other people's computers, that they are spying on them, and that they buy, sell, and trade slaves openly.

RATs can be entirely legitimate. Security companies have used them to help find and retrieve stolen laptops, for instance, and no one objects to similar remote login software such as LogMeIn. The developers behind RAT software generally describe their products as nothing more than tools that can be used for good and ill. And yet some tools have features that make them look a lot like they're built with lawlessness in mind.

RATs aren't going away, despite the occasional intervention of the authorities. Those who don't want to end up being toyed with in a YouTube video are advised to take the same precautions that apply to most malware: use a solid anti-malware program, keep your operating system updated, and make sure plugins (especially Flash and Java) aren't out of
55 date. Don't visit dodgy forums or buy dodgy items, don't click dodgy attachments in email, and don't download dodgy torrents. Such steps won't stop every attack, but they will foil many casual users looking to add a few more slaves to their collections.

A. Say whether the following statements are true or false, and justify your answer by quoting from the text. Indicate the reference AND copy the relevant passage (3 pts)

1. When installed on a user's computer, RAT software can allow unauthorized remote access to the computer.	T	F
2. Ratters frequently blackmail their victims with the information obtained from their computers.	T	F
3. The world of ratting is a highly secretive world in which members are vetted before being accepted.	T	F
4. BackOrifice's purpose was primarily to show the security deficiencies in Microsoft's system.	T	F
5. In order to get slaves, ratters have to be able to persuade their victims to run an infected file.	T	F
6. RAT software is illegal, but not many ratters get caught.	T	F

B. *Fill in the following table with words or expressions from the text that correspond to the definitions (5 pts)*

Line	*Synonyms/definitions*	*Words/expressions from the text*
	To appear suddenly	
	Embarrassing, shameful	
	To browse or search quickly through something	
	To manage to do something successfully	
	A system for making products to sell in which people work in their own homes and use their own equipment	
	To advertise or offer something for sale	
	To do something that makes people's opinion of someone or something not as good as it should be	
	A software program or hardware device that records all strokes on a computer keyboard, used either overtly as a surveillance tool or covertly as spyware	
	Evil	
	To prevent someone from doing something that they are trying to do	

C. *Answer the following questions on the text **in your own words** (8 pts)*

1. Why do you think victims of ratters are called "slaves"?

2. How does ratting work and what skills does it require?

3. What do you think of LaBrocca's defense of his hosting ratting-related discussions on his site?

Numéro d'Anonymat : .....

4. What can people do to protect themselves against ratters?

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II. Translate the following sentences: (4 pts)

1. Ce projet de recherche de 30 mois nous aidera peut-être à expliquer la cause de ce phénomène.

2. Il devient de plus en plus difficile de traiter les données fournies par les diverses équipes.

3. Cette expérience est très controversée, et les résultats ne devraient pas être publiés aussi tôt. Il n'y a pas de preuve convaincante qu'ils sont fiables.

4. Les scientifiques savent très peu de choses sur le sujet, mais les techniques qu'ils ont développées ces quinze dernières années devraient leur permettre de faire de nouvelles découvertes.

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I. Reading comprehension:

A Basic Rule of Chemistry Can Be Broken, Calculations Show

Tuesday, November 21, 2013 by Clara Moskowitz – Published in Scientific American

Most of us learned in high school chemistry class that chemical bonds can only form when electrons are shared or given away from one atom's outer shell to another's. But this may not be strictly true. A chemist has calculated that under very high pressure not just the outer electrons but the inner ones, too, could form bonds.

Inside atoms, electrons are organized into energy levels, called shells, which can be thought of as buckets of increasing size that can each hold only a fixed number of electrons. Atoms prefer to have filled buckets, so if their outer shell is missing just one or two electrons, they are eager to borrow from another atom that might have one or two to spare. But sometimes, a new study suggests, atoms can be incited to share not just their outer valence electrons, but those from their full inner shells. "It breaks our doctrine that the inner-shell electrons never react, never enter the chemistry domain," says Mao-sheng Miao, a chemist at the University of California, Santa Barbara, and the Beijing Computational Science Research Center in China.

Miao predicted such bonds using so-called first-principles calculations, which rely purely on the known laws of physics, and reported his findings in a paper published September 23 in *Nature Chemistry*. Such bonding has yet to be demonstrated in a lab. Nevertheless, "I'm very confident that this is real," he says. (*Scientific American* is part of Nature Publishing Group.)

His calculations show that two possible molecules could form between cesium and fluorine atoms under extremely high pressure—about 30 gigapascals (higher than the pressure at the bottom of the ocean, but less than at Earth's center). Cesium, all the way on the left side of the periodic table, has one superfluous electron in its outer, or sixth shell. Fluorine, on the other hand, is toward the far right of the table, just next to the column of noble gases with completely full shells (which is why noble gases are notoriously unreactive—they have little incentive to gain or lose electrons) and is one electron short of a full outer shell. "Under normal pressure, cesium gives an electron completely to fluorine and they bind together," Miao says. "But under high pressure, the electrons from cesium's inner shells start to form molecules with fluorine."

Miao identified two compounds that could form and remain stable up to very high pressures: cesium trifluoride (CsF_3), where cesium has shared its one valence electron and two from an inner shell with three fluorine atoms, and cesium pentafluoride (CsF_5), where cesium shares its valence electron and four inner-shell electrons to five fluorine atoms. "That forms a very beautiful molecule, like a starfish," Miao says. Both the shape of the resulting molecules and the possibility of their formation are "very surprising," says chemist Roald Hoffmann, a professor emeritus at Cornell University, who was not involved in the calculations. "This is the first clear case of an alkali metal not only losing its single easily ionized valence electron in bonding, but also 'breaking into the core' in its bonding with several fluorines."

The reason these reactions may occur has to do with enthalpy—a measure of the total energy of a system at constant pressure. Chemical reactions tend to move toward products with lower enthalpy. Miao calculated the enthalpy of cesium fluoride (the basic one-to-one bond of two atoms that forms naturally) and the enthalpy of the possible compounds cesium trifluoride and cesium pentafluoride. He found that above certain pressure thresholds, these larger molecules had lower enthalpy—and therefore were likely to form. "Pretty much everything we see in terms of structure and bonding is merely a manifestation of the system finding ways to minimize the potential energy, balancing the energy gain from the energy cost," says Purdue University chemist Paul Wenthold, who was not involved in the study. "Although inner-shell electron oxidation is not normally expected for something like cesium, if you put it in close enough proximity of something with a high enough propensity to accept electrons, sure enough, it will do it." [...]

A. Say whether the following statements are true or false, and justify your answer by quoting from the text. Indicate the reference AND copy the relevant passage (3 pts)

1. Electrons are arranged within atoms according to energy.	T	F
2. Miao's study tends to confirm what most scientists were suggesting.	T	F
3. Miao had to use concepts that were not strictly within the field of chemistry.	T	F
4. The pressure needed is the highest found on Earth.	T	F
5. Alkali metals are known to lose inner-shell electrons to fluorines in other cases.	T	F
6. Bonding processes tend to favour systems with less energy.	T	F

B. *Fill in the following table with words from the text that correspond to the definitions (5 pts)*

Line	*Synonyms/definitions*	*Words from the text*
	Outside part of something, surrounding case of something. (Noun)	
	Link	
	Augment, get bigger, larger…	
	Have a surplus or an excess of something	
	Exterior (Adjective)	
	Has not been established at this point (and needs to be)	
	Lacks one [element, piece…] to be full	
	Combination	
	Happen, take place	
	Lower limit, minimum	

C. *Answer the following questions on the text* ***in your own words*** *(8 pts)*

1. Give other examples of "doctrine-breaking" studies or discoveries.

2. Explain principles that apply to form stable compounds to a non-specialist

3. Explain how Miao's model could be tested experimentally.

4. Do you think such theoretical research is particularly helpful for experimental scientists?

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II. Translate the following sentences: (4 pts)

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3. Cette expérience est très controversée, et les résultats ne devraient pas être publiés aussi tôt. Il n'y a pas de preuve convaincante qu'ils sont fiables.

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Crowdsourcing new strategies for cancer treatment: Towards swarming nanobots

From ROBOHUB.org
by Sabine Hauert , September 4, 2013

NanoDoc is our new online game to crowdsource the design of nanomedicine.

The game allows bioengineers and the general public to imagine new nanoparticle strategies towards the treatment of cancer. It uses a simulator to predict how nanoparticles behave in tumors, and is based on years of research at the laboratory of Sangeeta Bhatia at MIT. The challenge is to design nanoparticles that interact with each other and their environment in a way that leads to better treatment outcomes.

The first levels of the game are used to train new NanoDocs; licensed NanoDocs are then given challenges to solve. We hope the drive to help fight cancer and learn about nanomedicine will empower the crowd to discover original, creative and efficient nanoparticle strategies that we have not thought of in the lab. Our ultimate goal is to discover ways in which nanoparticles can cooperate, or swarm, like self-organized systems in nature. Best strategies will be considered for validation in the lab or using robotic swarms.

Nanoparticles

Cancer causes one in every four deaths in the USA. To treat cancer, bioengineers have designed nanoparticles that can deliver drugs and diagnostics directly to tumors. After injection, typical chemotherapies tend to seep out of the blood stream throughout the body. The drugs are then free to attack all the cells encountered – even healthy ones - thereby causing side effects. By comparison, nanoparticles are slightly bigger than drugs, around 5 to 500 nanometers (or around 100 to 10'000 times smaller than a human hair). This special size allows them to leak out of the large pores in tumor vessels and yet still be contained in the blood stream throughout the rest of the body. As a result, nanoparticles can passively accumulate in tumors while avoiding healthy tissue (EPR effect).

Nanoparticles come in different sizes, shapes and materials. They can be loaded with drugs that are released in a controlled fashion, and coated with molecules that allow them to interact with their environment. Some of these molecules can serve as a signature to uniquely identify cancer cells. Upon binding, cells can engulf nanoparticles that then deliver their cargo intracellularly. Nanoparticles can also be made of energy-receptive materials that heat up upon magnetic or laser excitation.

Embodied Intelligence

There are many ways you can design a nanoparticle. Depending on your design, the nanoparticle will move, sense and act in different ways – just like a robot. Control is embedded in the design of the nanoparticles and their interactions with the environment rather than their computational capabilities. In other words, changing the body of the nanoparticle will change its behavior: that is what we call embodied intelligence. The challenge is understanding which nanoparticle designs will improve treatment outcome. This is a difficult problem because trillions of nanoparticles typically interact in a tumor with millions of cells. Predicting and optimizing the emergent behavior of all these nanoparticles is guess work at best.

To simplify the problem, we have taken two steps. First, we designed a simulator that allows us to model how nanoparticles interact with each other and the tumor environment. The simulator is based on realistic values from scientific literature and is currently being used in our laboratory to help improve how we make nanoparticles for cancer treatment. Second, we zoom in to a representative area of the tumor instead of modeling the entire system. The hope is that if we chose the tumor section wisely, we will be able to generalize the results to the rest of the tumor. We have already used this setup to predict how well nanoparticles can penetrate into tumor tissue after they leave a vessel, and to design new nanoparticle strategies to improve cell death.

Swarm Control

Like our nanoparticles, flocks of birds, ant colonies, cells and robot collectives can exhibit seemingly complex swarm behaviors when large numbers of simple agents react to local information. By design, swarms are efficient, robust and scalable. Emergent swarm behaviors useful for real-world applications include amplification, optimization, mapping, structure assembly, collective motion, synchronization and decision making. Our goal now is to explore how nanoparticles can cooperate, or swarm, to synergistically improve their therapeutic effect.

Recent work by our laboratory, which uses nanoparticles that communicate in vivo to amplify tumor-homing, shows promise in this direction (von Maltzahn et al., Nature Materials, 2011). In this work, gold nanoparticles (...), would passively accumulate in the tumor. My colleagues would then heat the nanoparticles using a laser, thereby causing damage to the tumor tissue. The second wave of nanoparticles (...) were engineered to bind to the damaged tissue, and would therefore accumulate at higher numbers there. In a way, the nanoparticles were communicating through the environment. (...)

Using our simulator, we are now able to explore such nanoparticle swarm designs. (...) By smartly engineering the nanoparticles and how they interact with their environment, we are able to mark direct paths from the vessels to the cell. Similar to ants forming trails to your picnic table, these nanoparticles work by depositing and interacting with information in the environment.

Crowdsourcing

There are many such tumor scenarios and swarm strategies. Each one takes time to explore and requires large amounts of trial and error and human intuition. Furthermore, each problem is different, making it difficult to program a computer that can automatically design the nanoparticles. Instead, we have decided to make our simulator available through Nanodoc: an online game we developed for crowdsourcing the design of nanomedicine. Bioengineers can design their own tumor scenarios and submit them to the crowd. People like you can then come in and design different nanoparticle strategies, and test them using our scientific simulator. Our hope is that, together, we will discover unthought-of swarm strategies for novel medical applications.

Validation

In parallel to our simulator, we have been working on ways to translate your designs to reality. This will require expert bioengineers to imagine real nanoparticles. Select nanotreatments discovered using NanoDoc will be validated using 1) in vitro tissue-on-a-chip constructs that we have designed to emulate the extravasation of functionalized nanoparticles from artificial vessels into a compartment containing tumor cells and 2) robotic swarm systems (kilobots) in collaboration with Radhika Nagpal's lab from the Wyss Institute at Harvard University. (...)

TissueDevice

(...) Finally, thank you to all those who have been helping us develop NanoDoc over the last two years including Radhika Nagpal's lab, Eric Klopfer's lab, Srini Devadas' lab and the Human Frontier Science Program. We presented the first NanoDoc prototype at IROS last fall and have been working hard to integrate your feedback since then.

Ready to be a NanoDoc ? Let us know about your questions below.

I. Reading comprehension:

A. Say whether the following statements are true or false, and justify your answer by quoting from the text. Indicate the reference AND copy the relevant passage (3 pts)

1. Nanodoc begins with a quizz to test people's knowledge.	T	F
2. 25% of the people who die in the US die because of Cancer.	T	F
3. Nanoparticle behavior can easily and acurately be predicted.	T	F
4. Swarm behaviors are only studied by bioengineers.	T	F
5. Nanodoc has a limited number of tumor scenarios.	T	F

6. An initial version of Nanodoc has been presented in 2012.	T	F

B. Fill in the following table with words from the text that correspond to the definitions (5 pts)

Line	*Synonyms/definitions*	*Words from the text (single words or phrases)*
	To act, conduct oneself in a specific manner	
	Self-motivation; ability coupled with ambition.	
	To ooze, or pass slowly through pores or other small openings	
	To let go (of); to cease to hold or contain.	
	In a manner showing good judgement or the benefit of experience.	
	Apparently	
	Injury or harm; the condition or measure of something not being intact.	
	To lay down; to place; to put.	
	Not previously expected of imagined	
	The exudation of blood, lymph or urine from a vessel into the tissues.	

C. *Answer the following questions about the text* ***in your own words*** *(8 pts)*

1. What makes nanoparticles a more valuable prospect in cancer treatment than conventional chemotherapy treatments?

2. Explain how nanoparticles can be controlled, directly or indirectly.

3. What do you think about the crowdsourcing approach? Could it be the future of science?

4. How can, and how do scientists use feedback from internet users of Nanodoc?

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II. Translate the following sentences: (4 pts)

1) La méthode de Smith devrait permettre d'améliorer le traitement des données.

2) Des scientifiques de l'Institut Robert Frost ont l'intention d'utiliser un robot contrôlé par ordinateur pour collecter des échantillons.

3) Cette étudiante en thèse a réussi à publier un rapport bien écrit qui montre la nécessité de combiner sciences fondamentales et appliquées.

4) Le Dr. Fowler travaille sur ce sujet depuis des mois, mais n'a trouvé aucune molécule prête à être mise sur le marché. Peu de ses expériences ont fourni les résultats attendus.

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I. Reading comprehension:

Mounting microplastic pollution harms 'earthworms of the sea' – report

Jessica Aldred, *theguardian.com*, Monday 2 December 2013

Tiny bits of plastic rubbish ingested by marine worms is significantly harming their health and will have wider impact on ocean ecosystems, scientists have found. Microplastic particles, measuring less than 5mm in size, have been accumulating in the oceans since the 1960s and are now the most abundant form of solid-waste pollution on Earth.

Two UK-based studies published in the journal Current Biology looked at whether these near-invisible, microscopic plastics that sink into mud and sand in high concentrations are causing harm to species at the base of the food chain that ingest this sediment during feeding, and play a key ecological role as a source of food for other animals.

Using the lugworm as an indicator species, the first study, from the University of Exeter, found that worms feeding in highly contaminated ocean sediment ate less and had lower energy levels. The second study, from Plymouth University, has established for the first time that ingesting microplastics can transfer pollutants and additives to worms, reducing health and biodiversity.

Ingestion of microplastics by species at the base of the food web is a cause for concern as little has been known about its effects until now. Many other organisms that have a similar feeding behaviour, such as starfish, sea cucumbers and fiddler crabs, may be similarly affected.

Lugworms are common invertebrates found widely found across the whole of the north Atlantic, living in burrows in the sand of beaches. They eat sand particles, digesting any micro-organisms and nutrients and passing the sand as waste through their tail, leaving a distinctive trail or "cast" on the beach. The worm can make up about 30% of the biomass of an average sandy beach, making it an important source of food for wading birds and flatfish.

The "earthworms of the sea", lugworms provide another important ecosystem service by turning over large volumes of sand, replenishing organic material and oxygenating the upper layers to keep the sediment healthy for other animals and microorganisms to thrive in.

Microplastics can be made from polyethylene, polyethylene terephthalate, PVC or polystyrene. They are too small to be captured through existing wastewater treatment process, and wash straight into the ocean. They fall into three categories: the raw material called "nurdles" that are melted down to make larger plastic items or used as exfoliating beads in cosmetic products, or larger pieces of plastic that have degraded and broken down into smaller particles over time. Microplastics are also found as fibres and have been traced back to synthetic textiles like polyester that are used to make clothes, which can release up to 1,900 tiny fibres per garment every time they are washed.

Microplastics carry a complex mix of chemicals which have the potential to harm the worms, the research showed. Many plastics contain chemical additives, such as plasticisers, dyes, and antimicrobials, which can leach out into sediments and seawater. Microplastics also concentrate water-borne chemicals on their surfaces, such as pesticides and detergents. There has been much campaigning around the impact of larger marine plastic pollution, with widely documented instances of fish and bird entanglement, ingestion and suffocation. But particles of this microscopic size are available to a much broader range of marine organisms, who ingest and retain these tiny plastic particles and act as prey for larger species.

The first study, by Stephanie Wright from the University of Exeter, put worms into laboratory tanks of varying levels of plastics contamination for up to one month, measuring their growth, physiology, survival and ability to gain weight. She found that lugworms feeding in sediment that was highly contaminated with microplastics put on less weight than worms in clean sediment and had less energy to invest in key processes such as growth and reproduction. These effects could cause populations to decline with knock-on effects for predators, the paper found.

Reduced feeding also means the sediment is being reworked less, the research found. The condition of the sediment could fall, leading to a decline in the communities which live in it. Wright said: "If worms in contaminated environments were to reduce feeding levels by an amount comparable to that seen in the lab, it would mean significantly less turnover of sediment. In an area the size of the Wadden Sea, for instance, sediment turnover could drop by more than 130,000 litres each year."

"We believe our study has highlighted the need to reduce the amount of plastic waste and therefore microplastics which enter our seas," says Prof Tamara Galloway of the University of Exeter. "Plastics are enormously beneficial materials. However, if marine plastic pollution continues to increase, impacts such as those demonstrated in our laboratory studies could occur in the natural environment. It is therefore important that we prevent the accumulation of plastic and microplastic debris in marine habitats through better waste-handling practices and smarter choices in the materials we use."

A. Say whether the following statements are true or false, and justify your answer by quoting from the text. Indicate the reference AND copy the relevant passage (3 pts)

1. Lugworms are threatened by microplastics floating at the surface of seawater.	T	F
2. Worms roughly represent a third of the total mass of organisms on a beach.	T	F
3. Worms are preys to animals like starfish and fiddler crabs.	T	F
4. Worms are not only an important part of the food chain, they also play a crucial role for their habitat.	T	F
5. Microplastics can be found in all sorts of consumer products.	T	F
6. The study was based on experiments conducted in a natural environment.	T	F

B. *Fill in the following table with words from the text that correspond to the definitions (5 pts)*

Line	*Synonyms/definitions*	*Words from the text (single words or phrases)*
	growing larger or more numerous	
	invertebrate animal with a long, slender, soft body and no limbs	
	a hole or tunnel dug by a small animal as a dwelling	
	a mass of earth or sand ejected onto the surface by an animal	
	prosper, flourish	
	the basic material from which a product is made	
	microplastic pellet the size of a pea	
	a natural or synthetic substance used to add a color to or change the color of something.	
	drain away from soil by the action of percolating liquid	
	a secondary, indirect, or cumulative effect	

C. *Answer the following questions about the text* ***in your own words*** *(8 pts)*

1. What are the consequences of the ingestion of microplastics by lugworms on ocean ecosystems?

2. Explain why "larger marine plastic pollution" (l.30) has had a greater impact so far.

3. Can you think of another example of species whose decline may have considerable impact on its environment? Explain.

4. How can we "reduce the amount of plastic waste and (...) microplastics which enter our seas" (l.42-43)?

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II. Translate the following sentences (4 pts):

1) La méthode de Smith devrait permettre d'améliorer le traitement des données.

2) Des scientifiques de l'Institut Robert Frost ont l'intention d'utiliser un robot contrôlé par ordinateur pour collecter des échantillons.

3) Cette étudiante en thèse a réussi à publier un rapport bien écrit qui montre la nécessité de combiner sciences fondamentales et appliquées.

4) Le Dr. Fowler travaille sur ce sujet depuis des mois, mais n'a trouvé aucune molécule prête à être mise sur le marché. Peu de ses expériences ont fourni les résultats attendus.