令和７年度　九州産業大学大学院入学試験問題用紙（春期）

情報科学研究科 情報科学専攻 博士前期課程　　入試区分：一般入試

次頁以降の英文を読み、以下の設問に答えなさい。解答は、すべて解答用紙に記入すること。

設問１．下線部を和訳しなさい。

Question 1: Translate the underlined sentences into Japanese.

設問２．二重下線部を和訳しなさい。

Question 2: Translate the double underlined sentences into Japanese.

設問３．本文中の空欄（１）と（２）に適切なものを(A)～(D)から選び、文を完成させなさい。

Question 3: Choose the best words for the blanks (1) and (2) out of (A)~(D) given below to complete the sentences.

（１）の選択肢

(A) of　(B) as　(C) from　(D) by

（２）の選択肢

(A) of　(B) with　(C) and　(D) in

設問４．次の文が本文の内容と合っていれば “True”、合わなければ “False” を書きなさい。

Question 4: If each of the following sentences matches the content of the article, write “True”; if not, write “False”.

（１）金融システムは完全にコンピュータ化されている。

答え/Answer: _____

（２）ソフトウェアシステムは物理的な制限がないため、急速に複雑になり、理解が困難になることがある。

答え/Answer: _____

（３）異なる種類のソフトウェアでも同じソフトウェア工学の手法と技術が必要である。

答え/Answer: _____

（４）ソフトウェア工学は、現代のソフトウェア開発には不十分である。

答え/Answer: _____

以下の設問に英語で答えなさい。
Answer the following questions in English.

設問５．本文中でソフトウェア集約型であるとされているエンターテイメントの種類を列挙しなさい。

Question 5: List the types of entertainment that are mentioned in the text as being software-intensive.

_____

設問６．本文中で挙げられているソフトウェアプロジェクトの失敗要因を列挙しなさい。

Question 6: List the factors of software project failure mentioned in the text.

_____

試験科目	英　語

Software Engineering is essential for the functioning of government, society, and national and international businesses and institutions. We can't run the modern world without software. National infrastructures and utilities are controlled by computer-based systems, and most electrical products include a computer and controlling software. Industrial manufacturing and distribution is completely computerized, as is the financial system. Entertainment, including the music industry, computer games, and film and television, is software-intensive. More than 75% of the world's population have a software-controlled mobile phone, and, by 2016, almost all of these will be internet-enabled.

Software systems are abstract and intangible. They are not constrained (1) the properties of materials, nor are they governed by physical laws or by manufacturing processes. This simplifies software engineering, as there are no natural limits to the potential of software. However, because of the lack (2) physical constraints, software systems can quickly become extremely complex, difficult to understand, and expensive to change.

There are many different types of software system, ranging from simple embedded systems to complex, worldwide information systems. There are no universal notations, methods, or techniques for software engineering because different types of software require different approaches. Developing an organizational information system is completely different from developing a controller for a scientific instrument. Neither of these systems has much in common with a graphic-intensive computer game. All of these applications need software engineering; they do not all need the same software engineering methods and techniques.

There are still many reports of software projects going wrong and of "software failures." Software engineering is criticized as inadequate for modern software development. However, in my opinion, many of these so-called software failures are a consequence of two factors:

1. *Increasing system complexity* As new software engineering techniques help us to build larger, more complex systems, the demands change. Systems have to be built and delivered more quickly; lager, even more complex systems are required; and systems have to have new capabilities that were previously thought to be impossible. New Software engineering techniques have to be developed to meet new the challenges of delivering more complex software.
2. *Failure to use software engineering methods* It is fairly easy to write computer programs without using software engineering methods and techniques. Many companies have drifted into software development as their products and services have evolved. They do not use software engineering methods in their everyday work. Consequently, their software is often more expensive and less reliable than it should be. We need better software engineering education and training to address this problem.

出典：Ian Sommerville. Software Engineering, Tenth Edition, Global Edition, 2016. Pearson Education Limited, ISBN-13: 978-1-292-09613-1.

試験科目	英　語

令和７年度　九州産業大学大学院入学試験問題用紙（春期）

情報科学研究科 情報科学専攻 博士前期課程　　入試区分 ： 一般入試

1.

$$A=\begin{bmatrix} 1 & 0 & 2 & -1 & 2 \\ 2 & 1 & 3 & -1 & -1 \\ -1 & 3 & -5 & 4 & 1 \end{bmatrix}$$ とする.

（1）行列Aの階数を求めよ.　(Find the rank of matrix A.)

（2）連立１次方程式　$A\boldsymbol{x}=\boldsymbol{0}$　$(\boldsymbol{x}\in\boldsymbol{R}^5)$　の解空間の次元と１組の基を求めよ.
(Find the dimension and a basis of the solution space of the following simultaneous linear equations $A\boldsymbol{x}=\boldsymbol{0}$ $(\boldsymbol{x}\in\boldsymbol{R}^5)$.)

（3）行列Aの列ベクトルの１次独立な最大個数ｒとｒ個の１次独立なベクトルを１組求め，他のベクトルをこれらの１次結合で表せ.
(Find the maximum number r of the linearly independent column vectors of A and these r vectors, and express the other vectors as a linear combination of them.)

（4）次の線形写像Tを考える.　(Consider the following linear mapping T.)

$T:\boldsymbol{R}^5\to\boldsymbol{R}^3$,　$T(\boldsymbol{x})=A\boldsymbol{x}$

（a）Tの核の次元と１組の基を求めよ.
(Find the dimension and a basis of the kernel of T.)

（b）Tの像の次元と１組の基を求めよ.
(Find the dimension and a basis of the image of T.)

2.

$$A=\begin{bmatrix} 7 & -6 \\ 3 & -2 \end{bmatrix}$$ とする.

（1）行列Aの固有値を求めよ.
(Find the eigenvalues of the matrix A.)

（2）各固有値の固有空間を求めよ.
(For each eigenvalue of the matrix A, find the eigenspace corresponding to it.)

（3）行列Aを対角化せよ.
(Diagonalize the matrix A.)

（4）A^nを計算せよ.
(Calculate A^n.)

試　験 科　目	情報科学基礎 (線形代数学)