BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SCIENCE EDUCATION

DEPARTMENT OF EDUCATIONAL TECHNOLOGY

BACHELOR OF SCIENCE EDUCATION IN COMPUTER SCIENCE

EDT112: HISTORY AND PHILOSOPHY OF COMPUTER SCIENCE

TIME: 3 HOURS

AUG 2024

INSTRUCTIONS

Answer **ALL the questions.** Each question carries **20** marks.
The question paper has **five** questions
Multiple Choice questions are **one** mark each and have **NO** part marks

Question 1

i. The Vacuum tubes are related to
   a) Fourth generation computers
   b) Third generation computers
   c) Second generation computers
   d) First generation computers

ii. ENIAC stands for
   a) Electronic numerical integrator and computer
   b) Electronic numerical integrator and calculator
   c) Electronic numerical integrator automatic computer
   d) Electronic numerical integrator automatic calculator

iii. Which Electronic components are used in Second Generation Computers?
   a) Transistors b) Integrated Circuits
   c) Vacuum Tubes d) VLSI

iv. Which Electronic components are used in Third Generation Computers?
   a) Transistors b) Integrated Circuits
   c) Vacuum Tubes d) VLSI

v. How many vacuum tubes are used in first generation computer ENIAC?
   a) 1800 b) 18000 c) 1024 d) 512

vi. Read the clues and name the machines
   a. Its numbers were marked on a set of rectangular rods. [1]

   b. Also known as IBM Automatic Sequence Controlled Calculator (ASCC). [1]

c. Invented by Gottfried Wilhelm Leibniz in 1672 [1]

d. Invented by Herman Hollerith in 1890 to assist in summarizing information and Accounting [1]

e. It was the first portable computer released in 1981. [1]

f. It is the longest word that you can write using the letters only on one row of Keyboard. [1]

g. It is the first mechanical computing machine. [1]

vii. Name **two** kinds of reasons for asking: What Computer Science i s in this course? [2]

viii. Explain the following theories: [4]
   a. The Correspondence Theory of Truth
   b. The coherence Theory of truth

ix. The American philosopher John Dewey said:

> *Active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusion to which it tends constitutes reflective thought. (Dewey, 1993)*

Interpret the above claim [2]

Question 2

i. What do computers Science and Philosophy have in common? [4]

ii. State the approaches used by philosophers such as Knuth, Rapaport, Vardi and Premiero to define **algorithms** [3]

iii. The **three** definitions of implementations advanced in the philosophy of Computer Science are as follows:
   a. Implementation as the Relation Specification-Artifact
   b. Implementation as Semantic Interpretation
   c. Implementation for LoAs

Explain **any two** of the above. **[6.5 Each]**

Question 3

Examine the ontological difference between hardware and software [20]

Question 4

Discuss whether Computer Science is a kind of Science or of Engineering? **[20]**

Question 5

i. Evaluate the following hypothetical debate.

Pro: If something behaves in all relevant ways as if it were cognitive, then it is cognitive.

Con: What do you mean by "being cognitive"?

Pro: I mean that it:

a. can perceive (see, hear, etc.);
b. has beliefs, desires, and intentions;
c. can remember;
d. can use and understand natural language;
e. can reason and make rational decisions; etc.

You know, the sort of thing that AI researchers are trying to achieve by computational means.

Con: Do you think they will succeed?

Pro: I'm optimistic: I think that a computer running a suitable AI program (or maybe a suite of programs) will eventually behave in all these ways.

Con: But that means that you think that such an AI-programmed computer will be cognitive?

Pro: Yes.

Con: But that's crazy! Computers and computer programs are purely syntactic!

Pro: Now it's my turn to ask for clarification: What do you mean by 'syntactic'?

Con: I mean that all a computer can do is to manipulate the symbols of a formal symbol system.

Pro: So what's the problem?

Con: The problem is that cognition is semantic! That is, it involves the semantic interpretation of those symbols.

Pro: Well, I'm not so sure about that. But suppose you're right. What then?

Con: Well, syntax does not suffice for semantics. So, no computer executing a purely syntactic computer program can exhibit semantic cognition, even if it behaves in all relevant ways as if it were cognitive.

a. Rewrite Pro's and Con's arguments in terms of premises and conclusions, and then evaluate those arguments. That is, "extract" each argument from the debate and put them in the following forms:

1. Pro's premise 1	1. Con's premise 1
2. Pro's premise 2	2. Con's premise 2
3. (etc.)	(etc.)
4. Therefore, Pro's conclusion	4. Therefore, Con's conclusion

[8]

b. Analyse each argument. **[12]**

NB: Keep in mind that premises and conclusions are declarative propositions (they can be deemed to be true or false) but that some lines uttered by Pro and Con are not declarative propositions (and thus can't be premises or conclusions). For example, Con's first statement is a question—it is not a premise or conclusion of anyone's argument—and Pro's second statement needs to be reformulated as something like "Something is cognitive means that it. . .".

THE END OF EXAMINATION PAPER