Practice 1

Introduction to Computers and Programming

Task 1. Multiple Choice (20 points)

1. A(n) _____ is a set of instructions that a computer follows to perform a task.

a. compiler
b. program
c. interpreter
d. programming language

2. The physical devices that a computer is made of are referred to as _____.

a. hardware
b. software
c. the operating system
d. tools

3. The part of a computer that runs programs is called _____.

a. RAM
b. secondary storage
c. main memory
d. the CPU

4. Today, CPUs are small chips known as _____.

a. ENIACs
b. microprocessors
c. memory chips
d. operating systems

5. The computer stores a program while the program is running, as well as the data that

the program is working with, in _____.

a. secondary storage
b. the CPU
c. main memory
d. the microprocessor

6. This is a volatile type of memory that is used only for temporary storage while a program is running.

a. RAM
b. secondary storage
c. the disk drive
d. the USB drive

7. A type of memory that can hold data for long periods of time, even when there is no
power to the computer, is called _____.
a. RAM
b. main memory
c. secondary storage
d. CPU storage

8. A component that collects data from people or other devices and sends it to the com☐puter is called _____.
a. an output device
b. an input device
c. a secondary storage device
d. main memory

9. A video display is a(n) _____ device.
a. output device
b. input device
c. secondary storage device
d. main memory

10. A _____ is enough memory to store a letter of the alphabet or a small number.
a. byte
b. bit
c. switch
d. transistor

11. A byte is made up of eight _____.
a. CPUs
b. instructions
c. variables
d. bits

12. In the _____ numbering system, all numeric values are written as sequences of 0s and 1s.
a. hexadecimal
b. binary
c. octal
d. decimal

13. A bit that is turned off represents the following value: _____.
a. 1
b. –1
c. 0
d. "no"

14. A set of 128 numeric codes that represent the English letters, various punctuation marks, and other characters is _____.
a. binary numbering
b. ASCII
c. Unicode
d. ENIAC

15. An extensive encoding scheme that can represent characters for many languages in the world is _____.
a. binary numbering
b. ASCII
c. Unicode
d. ENIAC

16. Negative numbers are encoded using the _____ technique.

a. two's complement
b. floating point
c. ASCII
d. Unicode

17. Real numbers are encoded using the _____ technique.
a. two's complement
b. floating point
c. ASCII
d. Unicode

18. The tiny dots of color that digital images are composed of are called _____.
a. bits
b. bytes
c. color packets
d. pixels

19. If you were to look at a machine language program, you would see _____.
a. Python code
b. a stream of binary numbers
c. English words
d. circuits

20. In the _____ part of the fetch-decode-execute cycle, the CPU determines which operation it should perform.
a. fetch
b. decode
c. execute
d. immediately after the instruction is executed

21. Computers can only execute programs that are written in _____.
a. Java
b. assembly language
c. machine language
d. Python

22. The _____ translates an assembly language program to a machine language program.
a. assembler
b. compiler
c. translator
d. interpreter

23. The words that make up a high-level programming language are called _____.
a. binary instructions
b. mnemonics
c. commands
d. key words

24. The rules that must be followed when writing a program are called _____.
a. syntax
b. punctuation
c. key words

d. operators

25. A(n) _____ program translates a high-level language program into a separate machine language program.
a. assembler
b. compiler
c. translator
d. utility

Task 2. Using Python (50 points)

Task 2.1 Installing Python
Description: The Python interpreter can run Python programs that are saved in files, or interactively execute Python statements that are typed at the keyboard. Python comes with a program named IDLE that simplifies the process of writing, executing, and testing programs.
Visit the Python official website (Download Python | Python.org) and click on the latest version available for Windows. Choose the appropriate installer. For most users, the Windows Installer (64-bit) or Windows Installer (32-bit) should work fine.
A convenient IED with integrated terminal is VSCode - a free IDE built by Microsoft. It has support for all major languages (Python). It also comes with built-in Git integration. Runs on macOS, Linux, and Windows. This IDE will be used in the course lectures.

- Download and install from Visual Studio Code - Code Editing. Redefined
- Tutorial can be found here https://www.youtube.com/watch?v=6i3e-j3wSf0

After you installed make sure that Python is on your PC by typing following command in terminal (for Windows): py -3 --version which will display Python Version installed. If you are using VS Code make sure that you installed corresponding extension.

Task 2.2 Python Exercise: Building Basic Programs
1. Create a program that displays your name and complete mailing address formatted in the manner that you would usually see it on the outside of an envelope. Your program does not need to read any input from user
2. Write a program that asks the user to enter the width and length of a room. Once the values have been read, your program should compute and display the area of the room. The length and the width will be entered as floating point numbers. Include units in your prompt and output message; either feet or meters, depending on which unit you are more comfortable working with.
3. Create a program that reads the length and width of a farmer's field from the user in feet. Display the area of the field in acres. Hint: There are 43,560 square feet in an acre.
4. In many jurisdictions a small deposit is added to drink containers to encourage people to recycle them. In one particular jurisdiction, drink containers holding one liter or less have a $0.10 deposit, and drink containers holding more than one liter have a $0.25 deposit. Write a program that reads the number of containers of each size from the user. Your program should continue by computing and displaying the refund that will be received for returning those containers. Format the output so that it includes a dollar sign and always displays exactly two decimal places.
5. The program that you create for this exercise will begin by reading the cost of a meal ordered at a restaurant from the user. Then your program will compute the tax and tip for the meal. Use your local tax rate when computing the amount of tax owing. Compute the tip as 18 percent of the meal amount (without the tax). The output from your program should include the tax amount, the tip amount, and the grand total for the meal including both the tax and the tip. Format the output so that all of the values are displayed using two decimal places.
6. Write a program that reads a positive integer, n, from the user and then displays the sum of all of the integers from 1 to n. The sum of the first n positive integers can be computed using the formula:

$$sum = \frac{(n)(n+1)}{2}$$

7. Consider the software that runs on a self-checkout machine. One task that it must be able to perform is to determine how much change to provide when the shopper pays for a purchase with cash. Write a program that begins by reading a number of cents from the user as an integer. Then your program should compute and display the denominations of the coins that should be used to give that amount of change to the shopper. The change should be given using as few coins as possible. Assume that the machine is loaded with pennies, nickels, dimes, quarters, loonies and toonies.

8. Many people think about their height in feet and inches, even in some countries that primarily use the metric system. Write a program that reads a number of feet from the user, followed by a number of inches. Once these values are read, your program should compute and display the equivalent number of centimeters. Hint: One foot is 12 inches. One inch is 2.54 centimeters.

9. Create a Python program that computes the area of a circle when given the radius as input. Prompt the user to input the radius, calculate the area using the formula $Area = \pi * r^2$, and display the result.

10. Design a Python program that converts temperature from Celsius to Fahrenheit. Prompt the user to input a temperature in Celsius, perform the conversion using the formula Fahrenheit = (Celsius * 9/5) + 32, and display the converted temperature. Enhance the program by incorporating validation to handle non-numeric inputs and ensure accurate temperature conversion, offering a practical exercise in fundamental Python programming skills.

Task 3. Provide short Answers (30 Points)

1. Why is the CPU the most important component in a computer?
2. What number does a bit that is turned on represent? What number does a bit that is turned off represent?
3. What would you call a device that works with binary data?
4. What are the words that make up a high-level programming language called?
5. What are the short words that are used in assembly language called?
6. What is the difference between a compiler and an interpreter?
7. What type of software controls the internal operations of the computer's hardware?