Republic of the Philippines
SULTAN KUDARAT STATE UNIVERSITY COLLEGE OF COMPUTER STUDIES
Isulan Campus, Isulan Sultan Kudarat

IT324 Embedded Systems

Midterm Exam Name: _____ Course: Year/Section: _____ Subject:_____

I. (Multiple Choice) Please write your answer before the number corresponding to the option you believe to be the best answer

1. What is the primary function of an embedded system?
   (a) To perform a wide range of tasks like a general-purpose computer.
   (b) To execute a specific task or set of tasks repeatedly.
   (c) To serve as a network file server.
   (d) To play games.
2. Which of the following is a core component of an embedded system?
   (a) A high-end graphics card (c) A large hard drive
   (b) A microcontroller or microprocessor (d) A Blu-ray drive
3. What is firmware in the context of embedded systems?
   (a) The mechanical parts of the system.
   (b) The operating system of a general-purpose computer.
   (c) Software specifically designed for the particular task of the embedded system.
   (d) External hardware components.
4. Which type of memory is typically used to store permanent data like the operating system in an embedded system?
   (a) RAM (Random Access Memory) (b) ROM (Read-Only Memory) (c) Flash Memory (d) Cache Memory
5. Which of the following is an example of an embedded system's input/output (I/O) interface?
   (a) CPU (b) Memory (c) Sensors (d) Power supply
6. Which of the following characteristics of a real-time embedded system?
   (a) It has unlimited resources. (c) It is primarily used for gaming.
   (b) It adheres to strict timing constraints. (d) It consumes large amounts of power.
7. In which of the following devices would you typically find an embedded system?
   (a) A personal computer (c) A network router
   (b) A microwave oven (d) A supercomputer
8. Which of the following is an example of an embedded system in the automotive industry?
   (a) A web server (b) An anti-lock braking system (ABS) (c) A desktop computer (d) A printer
9. Which of the following is an example of an embedded system in the medical field?
   (a) A pacemaker (b) A social media platform (c) A word processor (d) A spreadsheet program
10. What is a key consideration when designing embedded systems due to their resource constraints?
    (a) Maximizing code complexity (c) Using the latest, most power-hungry processors
    (b) Efficient code and power-saving techniques (d) Ignoring memory limitations
11. What does ECU stand for in the context of automotive embedded systems?
    (a) External Control Unit (c) Electronic Communication Unit
    (b) Engine Control Unit (d) Emission Control Unit
12. Which of the following is NOT typically a characteristic of embedded systems?
    (a) Single Functionality (b) Real-Time Operation (c) Unlimited Resources (d) Reliability and Stability
13. Which of the following is an example of a consumer electronic device that uses embedded systems?
    (a) A smart TV (c) A supercomputer
    (b) A mainframe computer (d) A calculator from the 1970s (without a chip)
14. What is the role of actuators in an embedded system?
    (a) To gather information from the environment (c) To control external devices
    (b) To store permanent data (d) To process data
15. Why is reliability important in embedded systems?
    (a) Because they are always used for entertainment purposes.
    (b) Because they often operate continuously and in harsh environments.
    (c) Because they need to be compatible with general-purpose computers.
    (d) Because they need to run the latest video games.
16. What is a "hard real-time" system?
    (a) A system that is physically very durable.
    (b) A system where missing a deadline can lead to catastrophic failure.
    (c) A system that is easy to program.
    (d) A system with flexible timing constraints.
17. Which communication interfaces enables communication with other systems?
    (a) Sensors (b) Actuators (c) Communication Interfaces (d) Memory
18. Which of the following is a medical embedded system?
    (a) Medical Embedded System (b) Insulin Pumps (c) Smartwatches (d) Airbag Systems
19. Which of the following is NOT a Key Characteristics of Embedded Systems
    (a) Single Functionality (b) Unlimited Functionality (c) Resource Constraints (d) Reliability and Stability
20. Which of the following is an automotive embedded system?
    (a) Smart TVs (b) Digital Cameras (c) Parking Sensors (d) Washing Machines
21. What is Arduino?
    a) A type of microcontroller c) A programming language
    b) An open-source electronics platform d) A circuit simulation software
22. Which of the following is NOT a component of an Arduino board?
    a) Microcontroller b) HDMI Port c) Digital and Analog Pins d) Power Jack
23. What is the programming language used in Arduino IDE?
    a) Python b) Assembly c) C/C++ d) Java
24. Which function is required in every Arduino sketch?
    a) setup() b) loop() c) Both setup() and loop() d) main()

25. What is the role of the setup() function in an Arduino sketch?
    a) To run continuously b) To execute once at the start c) To define global variables d) To handle errors
26. Which of the following is NOT an Arduino board?
    a) Arduino Uno b) Arduino Mega c) Arduino Nano d) Raspberry Pi
27. What is the baud rate for the default Serial Monitor communication in Arduino?
    a) 4800 b) 9600 c) 19200 d) 115200
28. Which command is used to read an analog input pin?
    a) digitalRead() b) analogWrite() c) analogRead() d) pinMode()
29. What type of pins can be used with digitalWrite()?
    a) Analog Pins b) Digital Pins c) PWM Pins Only d) I2C Pins Only
30. What is the function of the pinMode() function?
    a) Configures a pin as input or output b) Writes a value to a pin c) Reads an analog value d) Delays execution
31. Which of the following functions creates a delay in Arduino?
    a) pause() b) delay() c) sleep() d) hold()
32. What is the unit of the delay() function parameter?
    a) Microseconds b) Milliseconds c) Seconds d) Minutes
33. Which function continuously executes in an Arduino program?
    a) setup() b) loop() c) execute() d) run()
34. What is the function of digitalWrite(13, HIGH);?
    a) Turns off pin 13 b) Reads input from pin 13 c) Sends a HIGH signal (5V) to pin 13 d) Resets pin 13
35. Which of the following can be used for Pulse Width Modulation (PWM)?
    a) Analog Pins b) Digital Pins 0-1 c) Digital Pins with ~ symbol d) All Digital Pins
36. How many analog input pins are available on an Arduino Uno?
    a) 4 b) 6 c) 8 d) 10
37. What value range can be used with analogWrite() on an Arduino Uno?
    a) 0-1023 b) 0-255 c) 0-4095 d) 0-65535
38. What is the recommended operating voltage for an Arduino Uno?
    a) 3.3V b) 5V c) 9V d) 12V
39. What is the highest resolution of analogRead() in Arduino Uno?
    a) 8-bit b) 10-bit c) 12-bit d) 16-bit
40. What will Serial.begin(9600); do?
    a) Set analog pin 9 at 600 baud c) Delay the program for 9600 milliseconds
    b) Start serial communication at 9600 baud d) Set pin 9 as output
41. What is the default state of an unconnected digital input pin?
    a) HIGH b) LOW c) Floating (Unknown) d) Grounded
42. How do you define an integer variable in Arduino?
    a) integer x; b) var x = int; c) int x; d) x = int;
43. What happens if you exceed the bounds of an array in Arduino?
    a) The program stops executing
    b) An error message appears
    c) The memory might get overwritten, leading to undefined behavior
    d) The values automatically wrap around
44. Which of the following is a correct way to declare an array in Arduino?
    a) int values[] = {1, 2, 3, 4}; b) array values = {1, 2, 3, 4}; c) values = {1, 2, 3, 4}; d) list values = {1, 2, 3, 4};
45. What will sizeof(array) return in Arduino if array is declared as int array[5];?
    a) 5 b) 10 c) 20 d) Undefined
46. How do you access the third element of an array in Arduino?
    a) array(3); b) array[3]; c) array[2]; d) array{3};
47. What is the index of the first element in an Arduino array?
    a) 0 b) 1 c) -1 d) Depends on the declaration
48. What does const keyword do in Arduino?
    a) Makes a variable changeable c) Declares a global variable
    b) Prevents a variable from being modified d) Defines a function
49. What is the maximum number of elements in an Arduino array?
    a) 256 b) 512 c) Limited by available memory d) Unlimited
50. What happens if you do not initialize an array in Arduino?
    a) All elements are set to 0 c) The compiler throws an error
    b) The array contains random values d) The program crashes

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