

Quiz 1 - The Arduino Board

1. What AVR chip does the Arduino Uno and Nano use?
 - a. ATmega48P
 - b. ATmega168P
 - c. **ATmega328P**
 - d. ATmega88P
2. What voltage do the digital pins on the Arduino output?
 - a. 3.3v
 - b. **5v**
 - c. 7.5v
 - d. 12v
3. What speed does the Arduino Uno and Nano chip run at?
 - a. 8MHz
 - b. **16MHz**
 - c. 20MHz
 - d. 16GHz
4. What type of memory does the Arduino chip have on board?
 - a. **Flash, SRAM and EEPROM**
 - b. Flash, ERAM and EPROM
 - c. RAM, SRAM and ERAM
 - d. sFlash, RAM and EEPROM
5. What is stored in FLASH memory?
 - a. The data (variables) used by the code
 - b. **The Arduino program or sketch**
 - c. Temporary data
 - d. Flash animations
6. What is stored in SRAM?
 - a. The Arduino program or sketch
 - b. Large arrays
 - c. **The program data (variables)**
7. How much memory do you have to write your code on the Arduino?
 - a. 32 bytes
 - b. **32KB**
 - c. 32MB
 - d. 32GB
8. If you power down or reset your Arduino do you lose the program you have uploaded to it?
 - a. Yes
 - b. **No**

9. How much memory space do you get in SRAM?
- a. 2 bytes
 - b. 2KB**
 - c. 2MB
 - d. 2GB
10. When you turn off or reset your Arduino, does any data stored in SRAM remain?
- a. Yes
 - b. No**
11. Is data stored in the EEPROM memory lost when you power off or reset the Arduino?
- a. Yes
 - b. No**
12. How much memory space do you get in the EEPROM?
- a. 1 byte
 - b. 1KB**
 - c. 1MB
 - d. 1GB
13. What special function do the pins marked with the ~ symbol have/
- a. Input Pins
 - b. Output Pins
 - c. PWM Pins**
 - d. Analog Pins
14. How many digital pins does the Arduino board have?
- a. 12
 - b. 13
 - c. 14**
 - d. 15
15. How many PWM pins are there?
- a. 4
 - b. 5
 - c. 6**
 - d. 7
16. How many analog pins does the Arduino Uno have?
- a. 4
 - b. 5
 - c. 6**
 - d. 7
 - e. 8
17. How many Analog pins does the Arduino Nano have?
- a. 4
 - b. 5**

- c. 6
 - d. 7
 - e. **8**
18. The test LED on the board is connected to which pin?
- a. D12
 - b. A0
 - c. **D13**
 - d. Vin
19. Can you use the Analog pins as Digital I/O pins also?
- a. **Yes**
 - b. No
20. Why is the Nano preferred over the Uno for prototyping?
- a. It is smaller than the Uno
 - b. It has 2 more analog pins (and therefore also digital) than the Uno
 - c. It can be pushed into a breadboard to make wiring easier
 - d. **All of the above**

Quiz 2 - Bits & Bytes & Data Types

1. How many digits are used in the binary system?
- a. 10
 - b. 8
 - c. **2**
 - d. 16
2. What are the digits in binary known as?
- a. Byte
 - b. Megabit
 - c. **Bit**
 - d. Nibble
3. What is the binary equivalent of the decimal number 4?
- a. 10
 - b. 11
 - c. **100**
 - d. 101
4. How many binary digits make up a byte on the Arduino?
- a. 2
 - b. 4
 - c. **8**

- d. 16
5. How many possible combinations of numbers can you store in a byte?
- a. 32
 - b. 64
 - c. 128
 - d. 256**
6. How many bytes are there in 16 bits?
- a. 1
 - b. 2**
 - c. 3
 - d. 4
7. What is the largest number you can store in 16 bits?
- a. 1023
 - b. 4095
 - c. 16383
 - d. 65535**
8. If you had an integer of value of 127 and divided it by 2, what number would you be left with?
- a. 63.5
 - b. 64
 - c. 63**
9. If you had a variable of type **byte** with the value 255 stored in it and you then add 1 to this variable, what value would the variable be after this calculation?
- a. 255
 - b. 256
 - c. 0**
 - d. -1
10. If you had a variable of type **byte** with the value 201 stored in it and you added 73 to this variable. What would the value of the variable be after this calculation?
- a. 274
 - b. 19**
 - c. 0
 - d. 183
11. What is the number range of the data type **char**?
- a. 0 to 255
 - b. 0 to 127
 - c. -128 to +127**

- d. -256 to +255
12. What values can you store in a **bool** data type?
- a. 0 to 255
 - b. True or False**
 - c. 0 to 7
13. How many bits make up an integer?
- a. 32
 - b. 8
 - c. 16**
14. What range of values can you store in an **int** ?
- a. 0 to 65535
 - b. -32768 to +32767**
 - c. 0 to 32767
 - d. -2,147,483,648 to +2,147,483,647
15. What range of values can you store in a **word** ?
- a. 0 to 255
 - b. -2,147,483,648 to +2,147,483,647
 - c. -32768 to +32767
 - d. 0 to 65535**
16. What data type will allow you to store digits after the decimal point?
- a. int
 - b. long
 - c. bool
 - d. float**
17. How many bits are there in the data type long?
- a. 16
 - b. 32**
 - c. 8
 - d. 48
18. If you needed to store a range of numbers between 0 and 250 what data type would you choose?
- a. int
 - b. long
 - c. float
 - d. byte**
19. If you needed numbers in the range -1000 to +1000 what data type would you use?

- a. float
 - b. long
 - c. char
 - d. int**
20. If you needed to store values between 1,000,000 and 4,000,000,000 what data type would you choose?
- a. long
 - b. float
 - c. unsigned long**
 - d. unsigned int
21. Choosing the right data type is important because?
- a. To ensure you are not using up unnecessary amounts of memory
 - b. To help your code run faster
 - c. To prevent unexpected results or errors
 - d. All of the above**

Quiz 3 - Variables, Constants and Mathematical Operators

1. What operator is used to assign a value to a variable?
 - a. ==
 - b. :=
 - c. =**
2. What symbol must go at the end of a line of code?
 - a. .
 - b. space
 - c. ;**
 - d. :
3. Once you set a data type for a variable, can the data type be changed later in your code?
 - a. Yes
 - b. No**
4. What is the name of a variable that cannot be changed?
 - a. Fixed
 - b. Temporary
 - c. Constant**
 - d. Persistent
5. What mathematical operator is used for division in C?
 - a. /**
 - b. \

c. ~

6. What is the mathematical operator used for multiplication in C?

- a. x
- b. X
- c. #
- d. *

7. What is the % operator called ?

- a. Modern
- b. Percent
- c. Fraction
- d. **Modulo**

8. Which of these groups of operators are in the correct order (from left to right) of operator precedence?

- a. () +- */% =
- b. = () */% +-
- c. */% +- = ()
- d. () */% +- =

9. What is the result of the following calculation? $2 * (8 * 4) / 4$

- a. **16**
- b. 32
- c. 8
- d. 4

10. What is the result of the following calculation? $2 * (2 * 2) * (2 * 2)$

- a. 4
- b. 8
- c. 16
- d. **32**
- e. 64

11. What is the result of the following calculation? $10 * ((32 / 2) / 4)$

- a. 10
- b. 16
- c. **40**
- d. 4

12. What is the result of the following calculation? $((8 * 12) / (5 * 3))$

- a. 15
- b. 12.8
- c. **6.4**

d. 3,2

Quiz 4 – Decisions

1. In an If statement is the code ran before or after the condition is checked?
 - a. Before
 - b. After**
2. What is the equality operator?
 - a. =
 - b. :=
 - c. ==**
 - d. <=
3. Why is it preferable to indent certain lines of code?
 - a. To make things look pretty
 - b. For the hell of it
 - c. To make it easier to see which lines of code belong to which function or code block**
4. What is the != operator?
 - a. Equality
 - b. Not equal to**
 - c. Assignment
5. What is the < operator?
 - a. Less than**
 - b. Greater than
 - c. Left Shift
6. What is the > operator?
 - a. Less than
 - b. Greater than**
 - c. Shift Right
7. What is the <= operator?
 - a. Less than
 - b. Greater than
 - c. Greater than or equal to
 - d. Less than or equal to**
8. What is the >= operator?
 - a. Greater than or equal to**
 - b. Greater than
 - c. Less than

d. Less than or equal to

9. Is the condition in the if statement true or false?

```
int temp = 27;  
if (temp > 30)  
{  
    // Do something  
}
```

- a. True
- b. False**

10. Is the condition in the if statement true or false?

```
float temp = 25.5;  
if (temp >= 25.5)  
{  
    // do something  
}
```

- a. True**
- b. False

11. Is the condition in the if statement true or false?

```
int height = 250;  
if (height != 200)  
{  
    // do something  
}
```

- a. True**
- b. False

12. What is the // operator?

- a. Division
- b. Double Division
- c. Comment**
- d. Line end

13. Which block of code is ran?

```
int temp = 24;  
if (temp > 25)  
{  
    // code block 1  
}  
else  
{
```

```
// code block 2  
}
```

- a. Block 1
- b. Block 2**
- c. Neither one
- d. Both

14. Which block of code is ran?

```
int temp = 15;  
if (temp < 10)  
{  
    // code block 1  
}  
else if (temp < 20)  
{  
    // code block 2  
}  
else  
{  
    // code block 3  
}
```

- a. Block 1
- b. Block 2**
- c. Block 3
- d. None

15. Which code block is ran?

```
temp = 50;  
if (temp >= 25)  
{  
    // code block 1  
}  
else if (temp <= 75)  
{  
    // code block 2  
}
```

- a. Block 1**
- b. Block 2
- c. Both

16. What is the && operator?

- a. Logical OR
- b. Logical NOT
- c. Logical AND**

17. What is the || operator?

- a. Logical AND
- b. Logical NOT
- c. **Logical OR**

18. Is the condition true or false?

```
int A = 25;
int B = 50;
if ((A == 25) && B == 25))
{
    do something
}
```

- a. True
- b. **False**

19. Is the condition true or false?

```
int A = 25;
int B = 50;
if ((A == 75) || B == 50))
{
    do something
}
```

- a. **True**
- b. False

20. Is the condition true or false?

```
int A = 25;
int B = 35;
if (A > 15 && B < 45)
{
    // do something
}
```

- a. **True**
- b. False

Quiz 5 - Iteration Quiz

1. In a while loop is the code ran before or after the condition is checked and found to be true?

- a. Before
- b. **After**

2. When will a while loop stop executing?

- a. After a set number of iterations
- b. When the condition is found to be true

c. When the condition is found to be false

3. In a do while loop is the code ran before or after the condition is checked and found to be true?

- a. **Before**
- b. After

4. How many times will the following while loop run?

```
int counter = 0;
while (counter < 10)
{
    // Do Something
    counter++;
}
```

- a. 9
- b. **10**
- c. 11
- d. Infinitely

5. How many times will the following while loop run?

```
int counter = 0;
while (counter < 15)
{
    // do something
}
```

- a. 14
- b. 15
- c. **Infinitely**

6. How many times will the following do while loop execute?

```
int counter = 0;
do
{
    // do something
    counter = counter + 5
} while (counter < 10)
```

- a. 0
- b. 1
- c. **2**
- d. 10
- e. Infinitely

7. How many times will the following do while loop execute?

```
int counter = 0;  
do  
{  
    // do something  
} while (counter > 10);
```

- a. Never
- b. Once**
- c. Twice
- d. Infinitely

8. How many times will the following for loop execute?

```
for (int counter = 0; counter < 10; counter++)  
{  
    // do something  
}
```

- a. Never
- b. 9
- c. 10**
- d. Infinitely

9. How many times will the following for loop execute?

```
for (int x = 10; x < 5; x++)  
{  
    // do something  
}
```

- a. Never**
- b. 5
- c. 10
- d. Infinitely

10. How many times will the following for loop execute?

```
for (int temp = 100; temp <= 1000; temp+=10)  
{  
    // do something  
}
```

- a. 100
- b. 1000
- c. 90**

d. Never

11. How many times will the following for loop execute?

```
for (int A = 100; A >=10; A++)  
{  
    // do something  
}
```

- a. 10
- b. 90
- c. 100
- d. **Infinitely**

12. How many times will the following for loop execute?

```
for (int counter = 0; counter < 100; )  
{  
    // do something  
}
```

- a. 99
- b. 100
- c. None
- d. **Infinitely**

13. How many times will the following for loop execute?

```
for (int counter = 0; counter < 50; )  
{  
    // do something  
    counter++;  
}
```

- a. Never
- b. 49
- c. **50**
- d. Infinitely

14. How many times will the following for loop run?

```
for (int x = 100; x >= 0; x = x - 25)  
{  
    // do something  
    counter++;  
}
```

- a. Never

- b. 4
- c. 5
- d. 25

Quiz 6 – Functions

1. Why should functions be used?
 - a. To keep the code within the main loop to a minimum
 - b. To make your code easier to read and debug, especially in large programs
 - c. To divide a big task into smaller pieces
 - d. To avoid rewriting certain logic or code over and over again
 - e. Reusability of code in other programs
 - f. **All of the above**
2. How many tasks should your functions perform?
 - a. **One**
 - b. Two
 - c. As many as I like
3. What is the creation of a function known as?
 - a. Function Creation
 - b. **Function Declaration**
 - c. Function Initialisation
4. The code that forms the body of a function is known as?
 - a. **Function Definition**
 - b. Function Declaration
 - c. Function Description
5. Which of the following is the correct syntax for a function?
 - a. `parameter_list function_name(return_type)`
`{`
 body of the function
`}`
 - b. **`return_type function_name(parameter_list)`**
`{`
 body of the function
`}`
 - c. `return_type parameter_list(function_name)`
`{`
 body of the function
`}`
6. Is it a requirement that your function has to return a value when called?

- a. Yes
 - b. No**
7. Is it a requirement that you must supply data in the parameter list before calling a function?
- a. Yes
 - b. No**
8. Can you call a function from within another function?
- a. Yes**
 - b. No

Quiz 7 – Arrays

1. How would you access the 5th element of this array?
- ```
int positions[10] = {24, 3, 7, 9, 18, 22, 87, 99, 102, 21};
```
- a. `int element = positions[5];`
  - b. `int element = positions[4];`**
  - c. `int element[5];`
  - d. `int element[4];`
2. What is the value of 'element' ?
- ```
int brightness[5] = {2,5,8,11,16};  
int element = brightness[4];
```
- a. 11
 - b. 16**
3. Can you increase the size of an array after it has been declared?
- a. Yes
 - b. No**
4. Why does the index of an array start at 0 and not 1?
- a. Computers always count from 0 and not from 1
 - b. The index is the number of digits away from the start**
 - c. The index is the number of array elements – 1
5. What is the value of total?
- ```
int brightness[10] = {5, 10, 15, 25, 30, 35, 40, 45, 50, 55};
int value1 = brightness[3];
int value2 = brightness[7];
total = value1 + value2;
```
- a. 55
  - b. 60
  - c. 65



d. 70

6. How many elements does this array have?

```
int heights[] = {5,12,18,24,36, 47};
```

- a. This is invalid
- b. 5
- c. 6

7. Can you change the data type of an array after declaration?

- a. Yes
- b. No

8. If you had an array called of 10 elements filled with data and wanted to add another data point (to make the elements total 11). What valid method could you use to accomplish this using the knowledge you have learnt so far?

- a. Delete the array and create a new one of 11 elements
- b. **Create a new array of 11 elements, copy the 10 data points from the first array to the second then add the 11th data point to this new array.**
- c. `array[10] = array[11]`

9. What is the best way to iterate through an array?

- a. While Loop
- b. Do Loop
- c. **For Loop**
- d. Counter

10. What is the value of total?

```
int colours[5] = {202, 178, 64, 98, 50};
int total=0;
for (int index=0; index<5; index++)
{
 total = total + colours[index];
}
```

- a. **592**
- b. 542
- c. 390

11. What is the value of total?

```
int force[5] = {5, 10, 20, 40, 80};
int total=0;
for (index=1; index < 5; inxdex++)
{
 total = total + force[index];
}
```

- a. 155

- b. **150**
- c. 75

12. How many elements does this array have?

```
int array[10][10];
```

- a. 10
- b. 20
- c. **100**
- d. 1000

13. How would you access the value 50 in this 2D array?

```
int values[3][5] = { {25, 75, 65, 60, 55}, {175, 100, 150, 90, 20}, {15, 50, 45, 35, 25} };
```

- a. **int answer = values[2][1];**
- b. int answer = values[1][2];
- c. int answer = values[3][2];
- d. int answer = values[2][3];

14. What is value of total in this array?

```
int positions[2][4] = {2, 5, 7, 9, 13, 18, 24, 27};
total = positions[1][2];
```

- a. 5
- b. 7
- c. 18
- d. **24**
- e. 27

15. What index is the value 99 at?

```
int heatIndex [4][2] = {17, 98, 22, 14, 99, 101, 128, 4};
```

- a. [2][4]
- b. [2][1]
- c. **[2][0]**
- d. [3][0]

16. How many elements does this array have?

```
int values[5][4][3];
```

- a. 12
- b. 23
- c. **60**

d. 24

17. What is the maximum number of elements an array can have?

- a. 1024
- b. 2048
- c. Infinite
- d. This depends on how many bytes are free in SRAM**
- e. This depends on how many bytes are free in FLASH memory

### Quiz 8 - Variable scope

1. What type of scope can variables have?

- a. Local scope only
- b. Global scope only
- c. Both local and global scope**
- d. Localised global scope

2. Will this code generate an error?

```
void function1()
{
 int A = 25;
 int B = 50;
 int C = A * B;
}
```

```
void function2()
{
 int D = C * 25;
}
```

- a. Yes**
- b. No

3. Will this code generate an error?

```
int A = 500;
void function1()
{
 int A = 50;
 int B = 100;
 int C = A * B;
}
```

```
void function2()
{
```

```
int D = A * 10;
}
```

- a. Yes
- b. No**

4. What is the value of TOTAL ?

```
int X = 150;
int Y = 200;
```

```
void function1()
{
 int Z = X + Y;
 int X = 25;
}
```

```
void function2()
{
 int Z = X * Y;
 int TOTAL = X + Y + Z;
}
```

- a. 700
- b. 30,350**
- c. 30,300
- d. 350

5. What is the value of TOTAL on the final line of this code?

```
int A = 100;
int B = 50;
int TOTAL = A + B;
```

```
void function1()
{
 int A = 50;
 int B = 500;
 int TOTAL = A * B;
}
```

```
TOTAL = A * B;
```

- a. 150
- b. 25,000
- c. 5000**

6. What is the value of n returned from this function?

```
int value = 100;
int increaseNumber(int n)
{
 n = n + 5;
 for (int n = 0; n < 100; n++)
 {
 Serial.println(n);
 }
 return n;
}
```

- a. 101
  - b. 105**
  - c. 100
  - d. 200
  - e. 199
7. What is good practise when naming global variables?
- a. Name the variable in capital letters
  - b. Add g\_ to the start of the variable name**
  - c. Add \_g to the end of the variable name

### Quiz 9 - Anatomy of an Arduino Program

1. What is the minimum number of functions required for an Arduino program to run?
- a. 0
  - b. 1
  - c. 2**
  - d. 3
- (Clue - These are the setup and loop functions.)*
2. How many times is the setup function executed?
- a. 0
  - b. 1**
  - c. 2
  - d. It will loop forever
3. What is ran first, the loop or the setup function?
- a. Loop
  - b. Setup**
4. Will your code still run if you delete the setup function?
- a. Yes

- b. No**
- 5. How many times is the loop function ran?
  - a. Once and once only
  - b. Forever**
  - c. Twice
- 6. What goes into your setup function?
  - a. Global variables
  - b. The main code
  - c. Code to initialise global variables and devices**
- 7. What goes in the loop function?
  - a. The main program code**
  - b. Global variables
  - c. Code to initialise your pins