**Solution**

**Task 2**

|  |  |  |
| --- | --- | --- |
| Decimal | Binary | Hexadecimal |
| **11342** | **10110001001110** | **2C4E** |

Decimal to Binary: Decimal to Hex:

11342 2 = 5671 R **0** 11342/**16** = 708.**875** 708 R **14** 14 = **E**

5671 2 = 2835 R **1** 708/16 = 44.26 44 R 4 4 = **16**

2835 2 = 1417 R **1**  44/16 = 2.75 2 R 12 12 = **C**

1417 2 = 708 R **1**  2/16 = 0.125 0 R 2 2 = **2**

708 2 = 354 R **0**

354 2= 177 R **0**

177 2= 88 R **1**

88 2= 44 R **0**

44 2 = 22 R **0**

22 2= 11 R **0**

11 2= 5 R **1**

5 2= 2 R **1**

2 2= 1 R **0**

1 2= 0 R **1**

**b)**

99999 2 R **1 Addition:**

49999 2 R 1 1 1 0 0 10 10 1 1 0 1 0 10 11 11 11 1 1

24999 2 R 1 + 1 0 1 1 0 0 0 1 0 0 1 1 1 0

12499 2 R **1 1 1 0 1 1 0 0 1 0 1 1 1 0 1 1 0 1**

6249 2 R **1**

3124 2 R **0**

1562 2 R **0 Subtraction:**

781 2 R **1** 1 1 0 0 0 0 1 1 0 1 0 0 1 1 1 1 1

390 2 R **0 -** 1 0 1 1 0 0 0 1 0 0 1 1 1 0

195 2 R **1** **1 0 1 0 1 1 0 1 0 0 1 0 1 0 0 0 1**

97 2 R **1**

48 2 R **0**

24 2 R **0**

12 2 R **0**

6 2 R **0**

3 2 R **1**

1 2 R **1**

**C)**

We use hex number system in order to reduce large strings of binary numbers by grouped them into 4 digits to be more understandable. Moreover , it is commonly used to represent combinations of colors for programming languages (e.g JavaScript , Python , CSS)

**Task 3**

Golib&Gulnoza

|  |  |  |
| --- | --- | --- |
| Lettters | Frequency | Encoding |
| G | 2 | 110 |
| O | 2 | 00 |
| L | 2 | 111 |
| B | 1 | 1101 |
| I | 1 | 1001 |
| U | 1 | 0111 |
| A | 1 | 1010 |
| & | 1 | 1000 |
| (2x3)+(2x2)+(2x3)+(1x4)+(1x4)+(1x4)+(1x4)+(1x4)= **36 bits** | | |

1

0

13

5

8

1

1

0

1

0

1

0

1

0

1

0

0

1

0

Z

1

0

4

O

3

2

U

N

2

L

G

4

2

B

A

I

&

**Task 4**

3, 4 , 2 ,4, 5, 2, 3, 7

2, 2, 3 ,4 ,4, 5, 7, in ascending order

**look up number is 2**

Step 1) Find midpoint through dividing total number by 2

**7/2 = 3.5 round up 4 and 4the number is midpoint**

**Midpoint is 4**

Step 2) If x < midpoint we ignore the range of right

**( 2<4 ) ~~4 ,4, 5, 7~~**

Step 3) Find midpoint 3/2 = 1.5 rounded 2

**Midpoint is 2**

Step 4) If x equal to Midpoint , number is found

**2 = 2 and number is found!**

**Task 5**

Paged memory technique divided main memory into small fixed-size units of storage which is known as Frames and also it is divide into page and stored in frames . Additionally , Page table map is operated by OS to keep track frames and pages connections. In this technique , page constant of fixed size.

1. 5 x 1024 + 85 = 5205
2. It cannot be calculated because logical address is greater than frame size which is called Illegal Address

**Task 6**

Differences **Agile** and **Waterfall** methodologies for developing software:

**Agile** divides a project into spinners**, [ 1 ]**

**Waterfall** separates into phases

**Agile** aid to finish plenty of small projects ,

**Waterfall** can only complete one project

**Agile** relies on more customers satisfaction ,

**Waterfall** is rather focus on delivery of successful projects

**Agile** demand to prepare for requirements every day ,

**Waterfal**l will be made once at the beginning of the process

**Agile** is performed testing and development at the same time

**Waterfall** is made testing phase after build phase only

**When Waterfall is appropriate to use: [ 2 ]**

If the project has lack of financial budget and also con not be increased;

It is more suitable to enhance the existing products where the features is well-defined and known

It is used that when project has exact start and end date with approved requirements before starting the process

**When Agile is appropriate to use:**

If your team want to produce innovative something and also it helps to discover new features and requirements for none existing form of product today with iterative way;

When projects need to be delivered in a short amount of time which is more vital than documentation process in Agile

It ensures your team to produce more new features by intensive way and gives sufficient time to think what needs to be built at the onset

**1.**

Santos JMD. Agile vs. Waterfall | Software Development Methodologies [Internet]. Project-Management.com. 2020 [cited 2021 Jan 14]. Available from: <https://project-management.com/agile-vs-waterfall/#:~:text=Agile%20is%20an%20incremental%20and>

**2.**

Parsons T. When to Use Waterfall vs. Agile | Macadamian [Internet]. Macadamian. 2019 [cited 2021 Jan 14]. Available from: <https://www.macadamian.com/learn/when-to-use-waterfall-vs-agile/>

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