**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/>

**Task 7**

Comparison between **Mesh** and **Ring** network topologies

**Ring Topology : [ 1 ]**

Left and right side branches are connected and price is low rather than mesh;

In ring topology, devices are connected in a circular form which has resemblance of bus topology;

This topology is not used much nowadays;

It has ability to accelerate of network speed;

High speed for sending data;

**Mesh topology:**

All branches are connected each other;

This topology is so crucial for in mission network environments for example hospitals and institutions;

If one device does not works , the rest carry on working without interruption;

Embedding more devices which has no effect for others;

It takes much time for maintenance and implementations;

1.

https://www.facebook.com/networkstraining. Compare and Contrast Network Topologies (Star, Mesh, Bus, Hybrid etc) [Internet]. Networks Training. 2018 [cited 2021 Jan 14]. Available from: <https://www.networkstraining.com/compare-and-contrast-network-topologies/>

**Task 8**

Example for void function:

# void function does not return value!  
def compare\_age(n):  
 if n<18:  
 print("You are young ")  
 elif n<=30:  
 print("You are accepted")  
 else :  
 print("you are too old ")  
 print("thank you")

compare\_age(32)

def find\_President\_US(\*p):  
 p = ("Donald Trump","Joe Biden","SHavkat Mirzioev")  
 print(p[1])  
 # \* create tuples and we can access through index value   
find\_President\_US()

‌Example for value return function:

# value returning functions are always return vlaue by using return statement!  
def squared\_number(x):  
 y = x \* x  
 return y  
  
print(squared\_number(20))  
  
  
def deposit\_cal(amount ,rate):  
 return amount\*rate  
print(deposit\_cal(100,10))

**Task 9**

Example for OOP:

# object oriented programming  
# creating students class  
class student:  
 # creating instance attributes  
 def \_\_init\_\_(self, first,last,course,phone,location):  
 self.first=first  
 self.last=last  
 self.course=course  
 self.phone=phone  
 self.location=location  
  
 # instance method  
 def fullname(self):  
 return "{} {} ".format(self.first, self.last)  
  
 def fulladdress(self):  
 return "{} {}\n {}\n {}\n {}\n ".format(self.first,self.last,self.course,self.phone,self.location)  
  
 # giving value for instance objects  
student1 = student("Anvar","Yakhyoev","BIS","998-99-081-95-51","Samarkand")  
student2 = student("Jack","Petirson","Emob","1-998-99-081-00-00","London")  
  
# call instance methods  
print(student1.fulladdress())  
print(student2.fulladdress())  
  
# in OOP , we use objects to represent our data which objects hold data about the in attributes  
# and the attributes are manipulated through methods and functions which is given for objects  
  
# in Functional programming , output of function should always be the same ,given the same exact inputs to the function  
# data cannot be stored on objects only transforming by creating functions (nested functions and paralel programming )  
  
 # Functional programming  
# creating pure function  
# multiply list of numbers by 2  
def multiply\_2(numbers):

# creating new list for changed numbers  
 new\_numbers = []

# looping for each list item  
 for n in numbers:

# adding multiplied numbers in new list  
 new\_numbers.append(n\*2)

#returing value   
 return new\_numbers

# creating original number list  
original\_numbers =[2,4,10,20,30]

#creating veriable for changed list  
changed\_numbers =multiply\_2(original\_numbers)

print(original\_numbers)  
print(changed\_numbers)  
 # Creating new list for changed numbers;