

# Assignment 1 Part B – Trimester 2 July 2019

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## Program Tutor:

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**Information Technology Studies**

**Data Mining Tools and Technique**

Considering the training dataset shown in the following table for data mining classification. The table shows a training dataset for a problem of predicting whether a home loan applicant will repay his/her loan (safe situation) or defaulting on his/her loan (risky situation). For this purpose, decision tree approach is used to create classification rules.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **First Home Buyer** | **Income** | **Loan payment period** | **Loan-Decision** |
| C01 | Yes | 80- 100k | 30 yeas | Safe |
| C02 | No | 65 – 80k | 10 years | Risky |
| C03 | Yes | 80- 100k | 20 years | Safe |
| C04 | No | 50-65k | 30 yeas | Risky |
| C05 | Yes | 65 – 80k | 20 years | Safe |
| C06 | No | 50-65k | 30 years | Risky |
| C07 | Yes | 65 – 80k | 20 yeas | Safe |
| C08 | No | 65 – 80k | 30 years | Risky |
| C09 | No | 50-65k | 30 years | Safe |
| C10 | No | 65 – 80k | 30 yeas | Risky |
| C11 | Yes | 65 – 80k | 20 years | Safe |
| C12 | Yes | 80- 100k | 10 years | Risky |
| C13 | No | 80- 100k | 10 yeas | Risky |
| C14 | No | 65 – 80k | 20 years | Safe |
| C15 | No | 80- 100k | 20 years | Risky |
| C16 | Yes | 80- 100k | 10 yeas | Safe |
| C17 | No | 65 – 80k | 20 years | Safe |

**Task 1: Create Decision Tree:**

**GainInfo Algorithm:**

info(D) = - log2 - log2 = **0.996**

**![A picture containing text

Description automatically generated](data:image/jpeg;base64,/9j/4AAQSkZJRgABAQEAYABgAAD/4RDiRXhpZgAATU0AKgAAAAgABAE7AAIAAAAIAAAISodpAAQAAAABAAAIUpydAAEAAAAQAAAQyuocAAcAAAgMAAAAPgAAAAAc6gAAAAgAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAHZyYWplc2gAAAWQAwACAAAAFAAAEKCQBAACAAAAFAAAELSSkQACAAAAAzYwAACSkgACAAAAAzYwAADqHAAHAAAIDAAACJQAAAAAHOoAAAAIAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA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InfoDFHB = - log2 - log2 ] +- log2 - log2] = **0.758**

info(D) – info(D)FHB = 0.996 – 0.758 = **0.238**

**![A close up of a logo

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TVxWT4s/5EvWv+wfP/AOi2rXrI8Wf8iXrf/YPn/wDRbUqfxr1HL4Wa9ZGjf8hbX/8AsIJ/6SwVr1kaN/yFtf8A+wgn/pLBRHaXp+qB7o16KKKgoKKKKACiiigDBxnxpf8A/YPtf/RlxUfigf8AFH6z/wBeE/8A6LapRz401D/sH2v/AKMuKZ4pH/FHaz/14T/+i2rpXxx+Rm/hfzNQCnAUoFOArEsyo/EOmy3EkEbztJGXXAtZfnKNscIduHw3B25q/cXcFo0C3D7DcSiKPgncxBOOOnANcrd+DbySGf7PNE0lw90XE0rsiCScyIUBB2HGAwAAPvjNR3XgzULya62Pa2EdxeC4LxPvlPEuSWEaE/6wfKScAnDDiujkpP7RlzT7HbAUoFctpmiXEXidPNt47eyt4VuvJgUiFLkp5WEJAyoRScY4Le/O5DodrBdi5SW+LhiwD6hO6Z/3C5XHtjFYyjGPUtNvoSJqVm+qtpqzBrtIvNaMKeFyByemeRxnOCDjBq5isCy8NTWPiYajHqM8sDRzeZHKI8l5HVuoQErx3ORtUdOK6Cpmor4WON+pkeLP+RL1r/sHz/8Aotq16yPFn/Il63/2D5//AEW1a9D+Ber/AED7RkaN/wAhbX/+wgn/AKSwVr1kaN/yFtf/AOwgn/pLBWvRPf5L8gjsFFFFQUFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFFFFAGD4VH/FHaN/14Qf8AotaW4H/FZad/14XX/oy3pfCg/wCKN0X/AK8IP/Ra0twP+Kz07/rwu/8A0Zb10P8AiP5mX2V8jVApJS6QSNDH5kiqSqbtu444Ge1SAU2aCO4t5IJ0DxSKUdT0YEYIrE0OUi8Zf2dpTXGuiNpkfbJHEq2zxHYG2lJpAWPXBQsGxxQ3jdbW9vXvoSlklyLa1z5UbSt5YcsXeUKBg5AIXgrySSo1n8I6PIpEkNwzNndKb2YyOCACpffuK4A+UnHtU7+HdNaIxiGSPMvnb4p5I3D7AmQysGHygDAPNdHPR7GXLPuNTxFYPp9pexrdyQ3cYkjMFnLNge+xWwee9R6xq91baNFf6ZGmwyoJPtcbowVnC8IQDnnvjHXnpWtFEsMKRIWKooUF3LsQBjliSSfc8mqup6TaaxbiC/EzRBg22K4kiyR0zsYZ555rFOCknbQ0alYu0U2OMRRJGpYqihQWYscD1J5J9zTqzKMi5/5HTTf+wfd/+jLejxZ/yJet/wDYPn/9FtRc/wDI6ab/ANg+7/8ARlvR4s/5EvW/+wfP/wCi2raPxQ/rqZvaX9dDXooorE0CiiigAooooAKKKKACsRB/xWmof9g+1/8ARlxW3WLF/wAjpqP/AGD7T/0ZcVpDZ+n6omW6GeKh/wAUbrP/AF4T/wDotq1wKyvFQ/4o3Wv+vCf/ANFtWuBTfwL1f6C+0IBWHe6xeWXiFIJlihsWUeWZImzO21iQsudiMCANrgZ6g+m+BWdd+HdMvrp57uBpWf76GZ/LY7du4x52ltvG7GeBzwKUHFP3gkm9jBfxuL02iaNbktJdmGd3MUyxoIzITlJsHgdmONrZGcA6WjeMdM1tLhrQS/6PEszKoWVmQ5wQsbMc8fdOGHHFW7Xw3pdnKksUEjSI/mB5riSU52FOrsc/KSMHirGnaVa6WjJZ+eEYABJLmSRUA6BQzEKOegx29BWkpUmrJExU76sr/wBv2zWd3cRQ3n+iwtMwns5oNwAzgF1AJqDw1rE2rW8jXc0bTqqO0C2ctuYgwJAPmHLjg4YAA4NbLoksbRyKrowKsrDIIPYiqemaNZaQrrYxyL5gUM0kzysQowoy5JwB0HQVneHK1bUq0rovVkeLP+RL1v8A7B8//otq16yPFn/Il63/ANg+f/0W1Kn8a9Ry+FmvWRo3/IW1/wD7CCf+ksFa9ZGjf8hbX/8AsIJ/6SwUR2l6fqge6NeiiioKCiiigAooooAxEH/Faah/2D7X/wBGXFN8VD/ijdZ/68J//RbU+L/kdNR/7B9p/wCjLik8VD/ijda/68J//RbV0L+JH5foZv4X8zVApQKUCnAVgWYes6pe6dqVoqCGGxfHm3E0TupYuo2FlP7vgk7mBUnjjvn3njZXt7qLSLR5L6GaGLaXhlUeZL5eTsl9eNpZTkjOBkjfvdEsNQuUnu4nd1CghZnVXCncodQQHAJJwwI5PrUFv4X0m2J8q3k6xkB7iRwvluJECgsdoDAHAwPwreMqSSutTNxnfRlXRvF+n6tqZ02In7Uqvk7o8MUIV/lV2Zeem4DI6E9a0vt66jYTPoN3Z3Mit5Yk8zzI0bjIbaeoBzjI7cjOaW00i0sbqSe1EyNJuLR/aJDGCx3EiMttU55yAOp9TUuoWFvqmnzWV8hkt5l2yIHZNw9MqQaiThzaLQpKVtSroN7c6hpS3F2IyzSOEliUqkyBiFkVSSQGGCOT65wa0qgs7KKxg8mBp2XOczzvM3/fTkn8M1PUSabbRSvbUyPFn/Il63/2D5//AEW1a9ZHiz/kS9b/AOwfP/6Latem/gXq/wBBfaMjRv8AkLa//wBhBP8A0lgrXrI0b/kLa/8A9hBP/SWCteie/wAl+QR2CiiioKCiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigDG8Jj/ijdF/68IP8A0WtLcD/itNN/7B93/wCjLeqmkw+ItL0WysP7P0uX7Lbxw+Z/aMi79qgZx5BxnHSlkh8Rya1bah/Z2ljyLeWHy/7Rk+be0bZz5Hby+nv7V0W99u669UZfZSOixRWR9p8R/wDQK0v/AMGcn/xij7T4j/6BWl/+DOT/AOMVlyPy+9F8yNeisj7T4j/6BWl/+DOT/wCMUfafEf8A0CtL/wDBnJ/8Yo5H5feg5ka9FZH2nxH/ANArS/8AwZyf/GKPtPiP/oFaX/4M5P8A4xRyPy+9BzI16KyPtPiP/oFaX/4M5P8A4xR9p8R/9ArS/wDwZyf/ABijkfl96DmQXP8AyOmm/wDYPu//AEZb0eLP+RL1v/sHz/8AotqqSQ+I5NattQ/s7Sx5FvLD5f8AaMnzb2jbOfI7eX09/ajVofEeqaLe6f8A2fpcX2q3kh8z+0ZG27lK5x5AzjPStVHWLutPNdyG9GdFRRRXOahRRRQAUUUUAFFFFABWNAP+K01H/sH2n/oy4rZrFubbVoPEM9/p1tZ3EU9rDCRPdPEysjyntG2QfMHp0rSHVEy6C+Kx/wAUZrX/AGD5/wD0W1bAFc9q0PiLVNFvdP8A7O0uL7VbyQ+Z/aMjbdylc48gZxnpVv7T4j/6BWl/+DOT/wCMVTi+VLT715E31Neisj7T4j/6BWl/+DOT/wCMUfafEf8A0CtL/wDBnJ/8YqOR+X3ormRr0VkfafEf/QK0v/wZyf8Axij7T4j/AOgVpf8A4M5P/jFHI/L70HMjXorI+0+I/wDoFaX/AODOT/4xR9p8R/8AQK0v/wAGcn/xijkfl96DmRr1keLP+RL1v/sHz/8AotqPtPiP/oFaX/4M5P8A4xVTVofEeqaLe2H9naXF9qt5IfM/tGRtu5SuceQM4z0q4Rakm7fehSd0zoqyNG/5C2v/APYQT/0lgo+0+I/+gVpf/gzk/wDjFP0W0vbeTUbjUY4Ipby6EwjglaRVURRx/eKrz8hPTvSS5U7/ANahe7RqUUUVkWFFFFABRRRQBjQD/itNR/7B9p/6MuKPFY/4ozWv+wfP/wCi2pLm21aDxDPf6dbWdxFPawwkT3TxMrI8p7RtkHzB6dKr6tD4i1TRb3T/AOztLi+1W8kPmf2jI23cpXOPIGcZ6V0Je8pX7GT2aOhApayPtPiP/oFaX/4M5P8A4xR9p8R/9ArS/wDwZyf/ABisuR+X3ovmRr0VkfafEf8A0CtL/wDBnJ/8Yo+0+I/+gVpf/gzk/wDjFHI/L70HMjXorI+0+I/+gVpf/gzk/wDjFH2nxH/0CtL/APBnJ/8AGKOR+X3oOZGvRWR9p8R/9ArS/wDwZyf/ABij7T4j/wCgVpf/AIM5P/jFHI/L70HMg8Wf8iXrf/YPn/8ARbVr1zurQ+I9U0W9sP7O0uL7VbyQ+Z/aMjbdylc48gZxnpVv7T4j/wCgVpf/AIM5P/jFXyvlS0+9eQr63DRv+Qtr/wD2EE/9JYK16y9FtL23k1G41GOCKW8uhMI4JWkVVEUcf3iq8/IT071qVE9/u/IcdgoooqCgooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKAP/2Q==)

InfoDLPP = - log2 - log2] +- log2 - log2] +- log2 - log2] = **0.755**

info(D) – info(D)LPP = 0.996 – 0.755 = **0.241**

## Result:

As on the attribute number 3 InfoD LPP we found to be strongest valueso it can be selected to build decision tree which would be determine to data rules.

## Important Attribute:

As LPP (Loan Payment Period) has been chosen as the most significant characteristic this is the foundation of the choice tree and is additionally separated into its sub properties 10years, 20years and 30years. Since the foundation of the calculation has changed the info(D) condition will likewise change.

![A screenshot of a cell phone

Description automatically generated](data:image/jpeg;base64,/9j/4AAQSkZJRgABAQEAYABgAAD/4RDiRXhpZgAATU0AKgAAAAgABAE7AAIAAAAIAAAISodpAAQAAAABAAAIUpydAAEAAAAQAAAQyuocAAcAAAgMAAAAPgAAAAAc6gAAAAgAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAHZyYWplc2gAAAWQAwACAAAAFAAAEKCQBAACAAAAFAAAELSSkQACAAAAAzUwAACSkgACAAAAAzUwAADqHAAHAAAIDAAACJQAAAAAHOoAAAAIAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA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![A close up of a logo

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InfoD FHB = - log2 - log2  ] + [- log2 ] = **0.5**

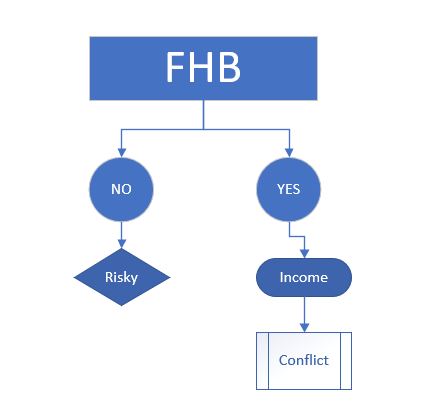
info(D) – info(D)FHB = 0.811 – 0.5 = **0.311**

**![A close up of a logo

Description automatically 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InfoD Income =- log2 - log2  ] + [- log2 ] = **0.688**

info(D) – info(D)income = 0.811 – 0.688 = 0.123



![A screenshot of a cell phone

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InfoD FHB = - log2 - log2  ] + [- log2 - log2 ] = **0.390**

info(D) – info(D)FHB = 0.591 – 0.390 = **0.201**

**![A picture containing screenshot

Description automatically 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InfoD Income =- log2 - log2  ] + [- log2 - log2  ] = **0.390**

info(D) – info(D)income = 0.591 – 0.390 = 0.201

![A close up of a sign

Description automatically generated](data:image/jpeg;base64,/9j/4AAQSkZJRgABAQEAYABgAAD/4RDiRXhpZgAATU0AKgAAAAgABAE7AAIAAAAIAAAISodpAAQAAAABAAAIUpydAAEAAAAQAAAQyuocAAcAAAgMAAAAPgAAAAAc6gAAAAgAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAHZyYWplc2gAAAWQAwACAAAAFAAAEKCQBAACAAAAFAAAELSSkQACAAAAAzU4AACSkgACAAAAAzU4AADqHAAHAAAIDAAACJQAAAAAHOoAAAAIAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA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![A screenshot of a cell phone

Description automatically 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**![A close up of a logo

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InfoD FHB = - log2 - log2  ] + [- log2 - log2 ] = **0.599**

info(D) – info(D)FHB = 0.911 – 0.599 = **0.312**

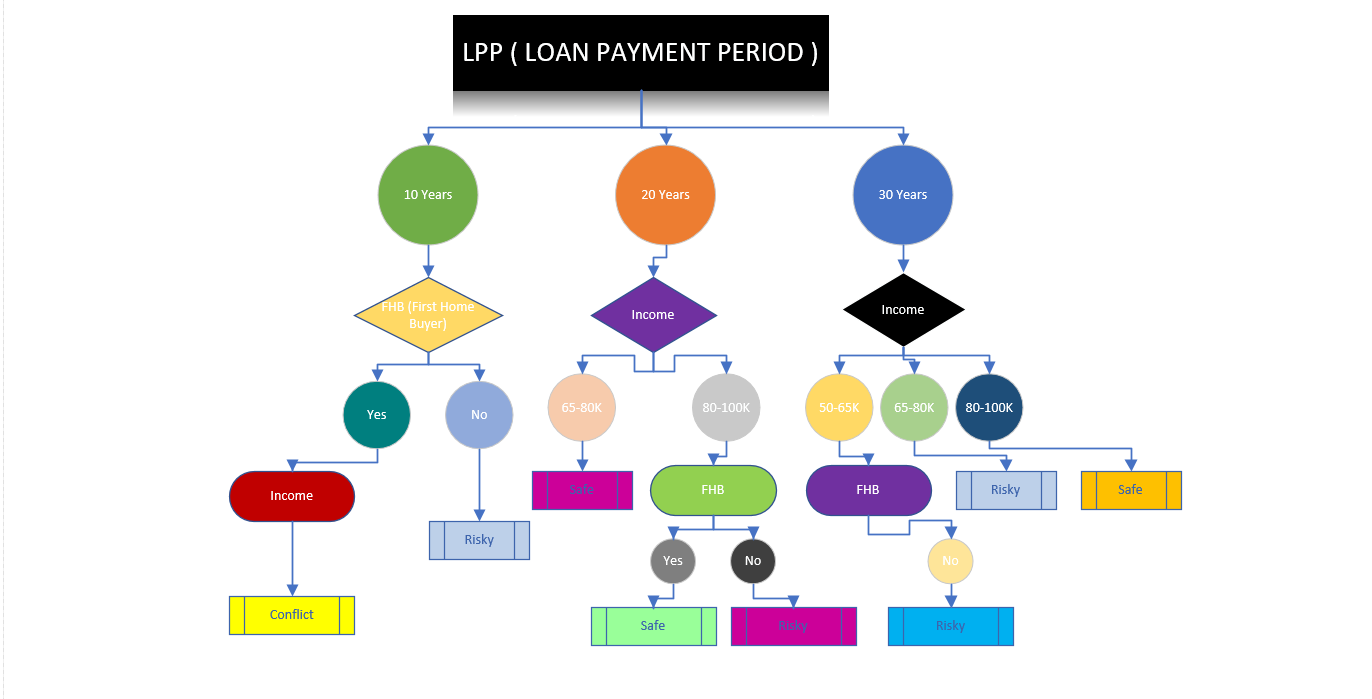
**![A screenshot of a cell phone

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R4T/5EvRP+wfB/6LWtesjwn/yJeif9g+D/ANFrWvRU+N+oR+FBWLr3/IR0H/sIN/6TT1tVja7/AMhLQf8AsIN/6TT06fxff+QS2L2KzPCo/wCKO0b/AK8IP/Ra1rYrL8KD/ijdF/68IP8A0WtP7D+X6i+0aoFYF34SiuNQur+KZIbu4m3GYQgsIjCsRiJzyPl3exPT16ECsTxPcX9vbxNp9w8SoJJZ/IEbTbFX7yrJwygkbhweRg9i6blzWi7XFK1tTPk8FTT2720mphLaSGKJ44onXzChjwzfvCN2I8ZUKeRycVLH4Yni1rSsyebaWcZWRtoQOsZ/0dCAeWXexyABx0GcVV1DxrOLXUF063ikMdnPNb3StKFJjUE53RBcgEnaGbkYOM5FzTPEd7/ayaTc2E85il8ie7G98Ps37iVhWPbyBnIPT5cc1u/b8t2Zr2d9DYk8PaNNeG7m0ixkuS28zNbIXLeu7Gc+9U5PDkj6w1wL0LZSXaXr23k/OZVQKMPu4X5VJG09OorUivEupLiG3EySw/KWmtpFTJzggsAHHH8J/HmqXhy4u7jTZvt9x9pmiu54TLsCbgshUcDpwP8A9dc6lNJu5raLZrUUUVkWZHhP/kS9E/7B8H/otaLn/kdNN/7B93/6Mt6PCf8AyJeif9g+D/0WtFz/AMjppv8A2D7v/wBGW9bf8vJfP9TP7K+Rr0UUViaBRRRQAUUUUAFFFFABRRRQBkeJ/wDkERf9f9l/6VRVpAVm+Jv+QTD/ANhCy/8ASqKtQCtPsL1f6E/aMjw0P+JVN/1/3v8A6VS1sAVk+GR/xKZv+whe/wDpVLWxRU+NhH4UVb3TLHUkRNRsre7VDuVZ4lcKfUZHFRtomlNcTTtplmZpwVlkNum6QHqGOMn8avUVPNJdR2RVOl2DaiuoNY2xvVGBcmFfMAxj72M9DirVFFJtvcZTXSNNTUTfpp9qt4ck3IgUSHIwfmxnpxVyiihtvcNgrI8M/wDIJm/7CF7/AOlUta9ZHhn/AJBM3/YQvf8A0qlql8D+X6k/aDWf+QtoH/YQf/0lnrXrI1n/AJC2gf8AYQf/ANJZ616JbR/rqwW7CiiioKMTw4P+JZP/ANhC9/8ASqWi4H/FZ6d/14Xf/oy3p3hsf8Suf/sIXv8A6VS0twP+K003/sH3f/oy3rd/xJfP9TL7K+RqgU4ClxRWJqUG0LSXNwX0uyY3XNwTbofO5z83Hzc8896kTStOjhMMdhapEYjCUWFQpjJyUxj7pJOR05q3RT5pdxWRBZ2Npp1v5Gn2sNrDkt5cEYRc+uBTbvTbHUDEb+zt7kwtujM0SvsPqMjg8VZopXd7hZWsFFFFIZkaz/yFtA/7CD/+ks9a9ZGs/wDIW0D/ALCD/wDpLPWvVy2j/XVkrdmR4T/5EvRP+wfB/wCi1rXrI8J/8iXon/YPg/8ARa1r0VPjfqEfhQVj65/yE9A/7CDf+ks9bFY+t/8AIU0D/sIN/wCks9FPf7/yCWxp4rK8Jj/ijdF/68IP/Ra1sYrK8Jj/AIovRf8AsHwf+i1p/Yfqv1F9o1QKr3umWOpIiajZW92qHcqzxK4U+oyKtUVF2ndFWKR0XSmuJpzplmZrhSk0ht13SKRghjjJBHXNPOl2DaiuoNY2xvVGBcmFfMAxj72M9DirVFPml3CyEdFkRkkUMrDDKwyCPSq1jpen6YrrptjbWYkILi3hWPdjpnA5q1RSu7WHYKKKKQGR4T/5EvRP+wfB/wCi1ouf+R003/sH3f8A6Mt6PCf/ACJeif8AYPg/9FrRc/8AI6ab/wBg+7/9GW9bf8vJfP8AUz+yvka9FFFYmgUUUUAFFFFABRRRQAUUUUAZ2u2dzfaX5VkIjOlxBMqzOUVvLmSQgkAkZCkdDUP2jxF/0CtL/wDBnJ/8YrXoq1Kys0S1rc53TIfEenWjw/2dpcm64mmz/aMgx5krSY/1HbdjPfFW/tPiP/oFaX/4M5P/AIxWvRTc03dpfj/mCjbqZH2nxH/0CtL/APBnJ/8AGKPtPiP/AKBWl/8Agzk/+MVr0UuZfyr8f8ws+5kfafEf/QK0v/wZyf8Axij7T4j/AOgVpf8A4M5P/jFa9FHMv5V+P+YWfcyPtPiP/oFaX/4M5P8A4xR9p8R/9ArS/wDwZyf/ABiteijmX8q/H/MLPuZH2nxH/wBArS//AAZyf/GKqaZD4j060eH+ztLk3XE02f7RkGPMlaTH+o7bsZ74roqKfOrWsvx/zDl8zDa31q+1TTZb20sLeCzuGmZobx5WbMMkYABiUdXB69q3KKKmUrjSsFFFFSM5+yg17TY54ILHTp4mup5kke/kRiJJXkGVEJwRux1PSmyQ+I5NattQ/s7Sx5FvLD5f9oyfNvaNs58jt5fT39q6Kitfaa3t+ZHL0uZH2nxH/wBArS//AAZyf/GKPtPiP/oFaX/4M5P/AIxWvRU8y/lX4/5js+5kfafEf/QK0v8A8Gcn/wAYo+0+I/8AoFaX/wCDOT/4xWvRRzL+Vfj/AJhZ9zI+0+I/+gVpf/gzk/8AjFH2nxH/ANArS/8AwZyf/GK16KOZfyr8f8ws+5kfafEf/QK0v/wZyf8Axij7T4j/AOgVpf8A4M5P/jFa9FHMv5V+P+YWfc529h8R3d3p839naWn2O4M2P7RkO/MUkeP9Rx/rM59qt/afEf8A0CtL/wDBnJ/8YrXop86fRfj/AJhy+ZR0Oyk03w/p1jOVaW1tYoXKElSyoAcZ7cVeooqG7u7GlZWCsvWrS9uJNOn06OCWWzujMY55WjVgYpI/vBW5+cHp2rUooi7O4NXMj7R4i/6BWl/+DOT/AOMVU0mHxHpei2Vh/Z2ly/ZbeOHzP7RkXdtULnHkHGcdK6Kir51a1l+P+YuXzMj7T4j/AOgVpf8A4M5P/jFH2nxH/wBArS//AAZyf/GK16KXMv5V+P8AmFn3Mj7T4j/6BWl/+DOT/wCMUfafEf8A0CtL/wDBnJ/8YrXoo5l/Kvx/zCz7mR9p8R/9ArS//BnJ/wDGKPtPiP8A6BWl/wDgzk/+MVr0Ucy/lX4/5hZ9zI+0+I/+gVpf/gzk/wDjFH2nxH/0CtL/APBnJ/8AGK16KOZfyr8f8ws+5zukw+I9L0WysP7O0uX7Lbxw+Z/aMi7tqhc48g4zjpVi2ttWuPEFvfajbWdvFBazQgQXTyszO8R7xrgDyz69a2qKbqXbdg5fMKKKKzKCiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigAooooA//2Q==)**

InfoD Income = - log2 - log2  ] + - log2 - log2  ] + - log2 - log2  ] = (0.455 + 0.333 ) = **0.788**

info(D) – info(D)income = 0.911 – 0.788 = **0.123**

## Decision Tree:



## Classification Rules:

* 1. If **LPP** – 10 & **FHB** =No    (**Risky)**
  2. If**LPP** – 20 & **INCOME** =65-80k    ( **Safe )**
  3. If **LPP** – 20 & **INCOME** =80-100k & FHB =Yes ( **Safe )**
  4. If **LPP** – 20 &**INCOME** =80-100k & FHB =No   ( **Risky)**
  5. If**LPP** – 30 &**INCOME** =50-65k & FHB =No     (**Risky)**
  6. If **LPP** – 30 & **INCOME** =65-80k  ( **Risky)**
  7. If**LPP** – 30 &**INCOME** =80-100k (**Risky)**

## Testing Dataset :

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CID** | **First Home Buyer** | **Income** | **Loan payment period** | **Loan-Decision** |
| C16 | Yes | 80- 100k | 30 yeas | Safe |
| C17 | Yes | 65 – 80k | 20 years | Safe |
| C18 | No | 65 – 80k | 20 years | Risky |
| C19 | No | 50-65k | 30 yeas | Safe |
| C20 | No | 65 – 80k | 30 years | Safe |
| C21 | No | 65 – 80k | 20 years | Risky |
| C22 | Yes | 65 – 80k | 30 yeas | Safe |
| C23 | No | 50-65k | 30 years | Risky |
| C24 | Yes | 65 – 80k | 30 years | Safe |
| C25 | No | 65 – 80k | 20 yeas | Risky |
| C26 | No | 50 – 65k | 20 years | Safe |
| C27 | Yes | 65- 80k | 10 years | Risky |
| C28 | No | 80- 100k | 20 yeas | Risky |
| C29 | No | 65 – 80k | 30 years | Safe |
| C30 | Yes | 80- 100k | 20 years | Safe |

## 

## Classification Rules – % Error Rate:

  If **LPP** – 10 & **FHB** =No  **(  Risky )**

  If**LPP** – 20 & **INCOME** =65-80k  **(Safe)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| C17 | Yes | 65 – 80k | 20 years | Safe |
| C18 | No | 65 – 80k | 20 years | Risky |
| C21 | No | 65 – 80k | 20 years | Risky |
| C25 | No | 65 – 80k | 20 yeas | Risky |

  If **LPP** – 20 & **INCOME** =80-100k & FHB =Yes   ( **Safe )**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| C28 | No | 80- 100k | 20 yeas | Risky |
| C30 | Yes | 80- 100k | 20 years | Safe |

  If **LPP** – 20 &**INCOME** =80-100k & FHB =No  **(Risky)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| C28 | No | 80- 100k | 20 yeas | Risky |

  If**LPP** – 30 &**INCOME** =50-65k & FHB =No  **(Risky)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| C19 | No | 50-65k | 30 yeas | Safe |
| C23 | No | 50-65k | 30 years | Risky |

  If **LPP** – 30 & **INCOME** =65-80k   **(Risky)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| C20 | No | 65 – 80k | 30 years | Safe |
| C22 | Yes | 65 – 80k | 30 yeas | Safe |
| C24 | Yes | 65 – 80k | 30 years | Safe |
| C29 | No | 65 – 80k | 30 years | Safe |

  If**LPP** – 30 &**INCOME** =80-100k  **(Risky)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| C16 | Yes | 80- 100k | 30 yeas | Safe |

## Classification Rules - Error Rate < 50%:

  If **LPP** – 10 & **FHB** =No    (**Risky)**      ---------                          **% ERROR RATE = 0**

  If**LPP** – 20 & **INCOME** =65-80k  (**Safe)**  ------                  **% ERROR RATE = 75 %**

  If **LPP** – 20 & **INCOME** =80-100k & FHB =Yes    (**Safe)** ----  **% ERROR RATE = 50 %**

  If **LPP** – 20 &**INCOME** =80-100k & FHB =No   (**Risky** )-----   **% ERROR RATE = 100**

  If**LPP** – 30 &**INCOME** =50-65k & FHB =No    ( **Risky** ) ------ **% ERROR RATE = 50**

  If **LPP** – 30 & **INCOME** =65-80k     ( **Risky** )         -----         **% ERROR RATE = 0**

  If**LPP** – 30 &**INCOME** =80-100k    ( **Risky** )         ----- **% ERROR RATE = 0**