HW2

R26131167

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目錄

一、summary

```
# Load necessary libraries
library(dplyr)
library(Hmisc)

# Read the dataset
primary_data <- read.csv2("C:/Users/bcai3/Desktop/primary_data.csv")

# Convert categorical variables to factors (assuming all are categorical in the mushroom dataset)
primary_data <- primary_data %>% mutate(across(everything(), as.factor))

# Generate and display descriptive statistics
latex(describe(primary_data), descript = "Descriptive Statistics",
      file = '', caption.placement = "top")
```

```
\begin{spacing}{0.7}
\begin{center}\textbf{ primary\_data \\ 23 Variables~~~~~ 173 ~Observations}\end{center}
\smallskip\hrule\smallskip{\small
\vbox{\noindent\textbf{family}\setlength{\unitlength}{0.001in}\hfill\begin{picture}(1.5,.1)(1500,0)\line
\put(0,0){\line(0,1){19}}
\put(65,0){\line(0,1){7}}
\put(130,0){\line(0,1){33}}
\put(196,0){\line(0,1){16}}
\put(261,0){\line(0,1){7}}
\put(326,0){\line(0,1){26}}
\put(391,0){\line(0,1){2}}
\put(457,0){\line(0,1){2}}
\put(522,0){\line(0,1){16}}
\put(587,0){\line(0,1){2}}
\put(652,0){\line(0,1){30}}
\put(717,0){\line(0,1){2}}
\put(783,0){\line(0,1){7}}
\put(848,0){\line(0,1){2}}
\put(913,0){\line(0,1){12}}
```

```
\put(978,0){\line(0,1){5}}
\put(1043,0){\line(0,1){7}}
\put(1109,0){\line(0,1){5}}
\put(1174,0){\line(0,1){63}}
\put(1239,0){\line(0,1){2}}
\put(1304,0){\line(0,1){19}}
\put(1370,0){\line(0,1){100}}
\put(1435,0){\line(0,1){19}}
\end{picture}

{\smaller
\begin{tabular}{ rrr }
n&missing&distinct \\
173&0&23 \end{tabular}
\begin{verbatim}

lowest : Amanita Family      Bolbitius Family   Bolete Family      Bracket Fungi       Chanterelle Family
highest: Russula Family      Saddle-Cup Family  Stropharia Family  Tricholoma Family  Wax Gill Family
\end{verbatim}
}
\smallskip\hrule\smallskip
}
\vbox{\noindent\textbf{name}

{\smaller
\begin{tabular}{ rrr }
n&missing&distinct \\
173&0&173 \end{tabular}
\begin{verbatim}

lowest : Amethyst Deceiver        Aniseed Funnel Cap       Apricot Fungus         Bare-toothed Russula
highest: Yellow-gilled Russula    Yellow-staining Mushroom Yellow-stemmed Bell Cap  Yellow Swamp Russula
\end{verbatim}
}
\smallskip\hrule\smallskip
}
\vbox{\noindent\textbf{class}

{\smaller
\begin{tabular}{ rrr }
n&missing&distinct \\
173&0&2 \end{tabular}
\begin{verbatim}

Value           e       p
Frequency      77      96
Proportion 0.445 0.555
\end{verbatim}
}
\smallskip\hrule\smallskip
}
\vbox{\noindent\textbf{cap.diameter}\setlength{\unitlength}{0.001in}\hfill\begin{picture}(1.5,.1)(1500,0
\put(0,0){\line(0,1){12}}
```

```
\put(29,0){\line(0,1){19}}
\put(59,0){\line(0,1){6}}
\put(88,0){\line(0,1){6}}
\put(118,0){\line(0,1){6}}
\put(147,0){\line(0,1){44}}
\put(176,0){\line(0,1){31}}
\put(206,0){\line(0,1){25}}
\put(235,0){\line(0,1){6}}
\put(265,0){\line(0,1){6}}
\put(294,0){\line(0,1){12}}
\put(324,0){\line(0,1){6}}
\put(353,0){\line(0,1){6}}
\put(382,0){\line(0,1){6}}
\put(412,0){\line(0,1){6}}
\put(441,0){\line(0,1){50}}
\put(471,0){\line(0,1){100}}
\put(500,0){\line(0,1){62}}
\put(529,0){\line(0,1){12}}
\put(559,0){\line(0,1){6}}
\put(588,0){\line(0,1){31}}
\put(618,0){\line(0,1){6}}
\put(647,0){\line(0,1){12}}
\put(676,0){\line(0,1){38}}
\put(706,0){\line(0,1){25}}
\put(735,0){\line(0,1){38}}
\put(765,0){\line(0,1){50}}
\put(794,0){\line(0,1){31}}
\put(824,0){\line(0,1){6}}
\put(853,0){\line(0,1){56}}
\put(882,0){\line(0,1){19}}
\put(912,0){\line(0,1){75}}
\put(941,0){\line(0,1){38}}
\put(971,0){\line(0,1){6}}
\put(1000,0){\line(0,1){50}}
\put(1029,0){\line(0,1){6}}
\put(1059,0){\line(0,1){6}}
\put(1088,0){\line(0,1){6}}
\put(1118,0){\line(0,1){12}}
\put(1147,0){\line(0,1){31}}
\put(1176,0){\line(0,1){6}}
\put(1206,0){\line(0,1){12}}
\put(1235,0){\line(0,1){6}}
\put(1265,0){\line(0,1){19}}
\put(1294,0){\line(0,1){6}}
\put(1324,0){\line(0,1){6}}
\put(1353,0){\line(0,1){6}}
\put(1382,0){\line(0,1){6}}
\put(1412,0){\line(0,1){12}}
\put(1441,0){\line(0,1){12}}
\put(1471,0){\line(0,1){12}}
\end{picture}

{\smaller
```

```
\begin{tabular}{ rrr }
n&missing&distinct \\
173&0&51 \end{tabular}
\begin{verbatim}

lowest : [0.4, 1]    [0.5, 1.5] [0.5, 1]    [0.7, 1.3] [1, 1.5]
highest: [8, 14]     [8, 15]    [8, 20]     [8, 25]    [8, 30]
\end{verbatim}
}
\smallskip\hrule\smallskip
}
\vbox{\noindent\textbf{cap.shape}\setlength{\unitlength}{0.001in}\hfill\begin{picture}(1.5,.1)(1500,0)\l
\put(0,0){\line(0,1){2}}
\put(56,0){\line(0,1){10}}
\put(111,0){\line(0,1){2}}
\put(167,0){\line(0,1){6}}
\put(222,0){\line(0,1){21}}
\put(278,0){\line(0,1){4}}
\put(333,0){\line(0,1){2}}
\put(389,0){\line(0,1){2}}
\put(444,0){\line(0,1){6}}
\put(500,0){\line(0,1){17}}
\put(556,0){\line(0,1){4}}
\put(611,0){\line(0,1){17}}
\put(667,0){\line(0,1){17}}
\put(722,0){\line(0,1){6}}
\put(778,0){\line(0,1){2}}
\put(833,0){\line(0,1){4}}
\put(889,0){\line(0,1){4}}
\put(944,0){\line(0,1){8}}
\put(1000,0){\line(0,1){2}}
\put(1056,0){\line(0,1){4}}
\put(1111,0){\line(0,1){19}}
\put(1167,0){\line(0,1){27}}
\put(1222,0){\line(0,1){60}}
\put(1278,0){\line(0,1){2}}
\put(1333,0){\line(0,1){4}}
\put(1389,0){\line(0,1){6}}
\put(1444,0){\line(0,1){100}}
\end{picture}

{\smaller
\begin{tabular}{ rrr }
n&missing&distinct \\
173&0&27 \end{tabular}
\begin{verbatim}

lowest : [b, f, s] [b, f]     [b, x, f] [b, x]     [b]
highest: [x, f]    [x, o]     [x, p]    [x, s]     [x]
\end{verbatim}
}
\smallskip\hrule\smallskip
}
```

```
\vbox{\noindent\textbf{Cap.surface}\setlength{\unitlength}{0.001in}\hfill\begin{picture}(1.5,.1)(1500,0)
\put(0,0){\line(0,1){100}}
\put(37,0){\line(0,1){2}}
\put(73,0){\line(0,1){2}}
\put(110,0){\line(0,1){5}}
\put(146,0){\line(0,1){2}}
\put(183,0){\line(0,1){22}}
\put(220,0){\line(0,1){2}}
\put(256,0){\line(0,1){2}}
\put(293,0){\line(0,1){2}}
\put(329,0){\line(0,1){12}}
\put(366,0){\line(0,1){2}}
\put(402,0){\line(0,1){2}}
\put(439,0){\line(0,1){2}}
\put(476,0){\line(0,1){2}}
\put(512,0){\line(0,1){30}}
\put(549,0){\line(0,1){2}}
\put(585,0){\line(0,1){2}}
\put(622,0){\line(0,1){2}}
\put(659,0){\line(0,1){2}}
\put(695,0){\line(0,1){25}}
\put(732,0){\line(0,1){12}}
\put(768,0){\line(0,1){2}}
\put(805,0){\line(0,1){5}}
\put(841,0){\line(0,1){10}}
\put(878,0){\line(0,1){2}}
\put(915,0){\line(0,1){10}}
\put(951,0){\line(0,1){10}}
\put(988,0){\line(0,1){2}}
\put(1024,0){\line(0,1){2}}
\put(1061,0){\line(0,1){2}}
\put(1098,0){\line(0,1){10}}
\put(1134,0){\line(0,1){8}}
\put(1171,0){\line(0,1){32}}
\put(1207,0){\line(0,1){2}}
\put(1244,0){\line(0,1){5}}
\put(1280,0){\line(0,1){2}}
\put(1317,0){\line(0,1){30}}
\put(1354,0){\line(0,1){2}}
\put(1390,0){\line(0,1){12}}
\put(1427,0){\line(0,1){2}}
\put(1463,0){\line(0,1){35}}
\end{picture}

{\smaller
\begin{tabular}{ rrr }
n&missing&distinct \\
173&0&41 \end{tabular}
\begin{verbatim}

lowest :              [d, e, y, i] [d, k, s]    [d, k]       [d, s]
highest: [t]          [w, t]       [w]          [y, s]       [y]
\end{verbatim}
```

```
}
\smallskip\hrule\smallskip
}
\vbox{\noindent\textbf{cap.color}\setlength{\unitlength}{0.001in}\hfill\begin{picture}(1.5,.1)(1500,0)\
\put(0,0){\line(0,1){3}}
\put(22,0){\line(0,1){3}}
\put(45,0){\line(0,1){3}}
\put(67,0){\line(0,1){3}}
\put(90,0){\line(0,1){5}}
\put(112,0){\line(0,1){5}}
\put(134,0){\line(0,1){3}}
\put(157,0){\line(0,1){3}}
\put(179,0){\line(0,1){3}}
\put(201,0){\line(0,1){3}}
\put(224,0){\line(0,1){8}}
\put(246,0){\line(0,1){5}}
\put(269,0){\line(0,1){3}}
\put(291,0){\line(0,1){26}}
\put(313,0){\line(0,1){3}}
\put(336,0){\line(0,1){5}}
\put(358,0){\line(0,1){3}}
\put(381,0){\line(0,1){3}}
\put(403,0){\line(0,1){3}}
\put(425,0){\line(0,1){3}}
\put(448,0){\line(0,1){3}}
\put(470,0){\line(0,1){3}}
\put(493,0){\line(0,1){3}}
\put(515,0){\line(0,1){3}}
\put(537,0){\line(0,1){3}}
\put(560,0){\line(0,1){3}}
\put(582,0){\line(0,1){5}}
\put(604,0){\line(0,1){3}}
\put(627,0){\line(0,1){13}}
\put(649,0){\line(0,1){8}}
\put(672,0){\line(0,1){3}}
\put(694,0){\line(0,1){3}}
\put(716,0){\line(0,1){11}}
\put(739,0){\line(0,1){5}}
\put(761,0){\line(0,1){3}}
\put(784,0){\line(0,1){11}}
\put(806,0){\line(0,1){3}}
\put(828,0){\line(0,1){3}}
\put(851,0){\line(0,1){24}}
\put(873,0){\line(0,1){100}}
\put(896,0){\line(0,1){3}}
\put(918,0){\line(0,1){3}}
\put(940,0){\line(0,1){3}}
\put(963,0){\line(0,1){3}}
\put(985,0){\line(0,1){3}}
\put(1007,0){\line(0,1){8}}
\put(1030,0){\line(0,1){5}}
\put(1052,0){\line(0,1){5}}
\put(1075,0){\line(0,1){3}}
```

```
\put(1097,0){\line(0,1){3}}
\put(1119,0){\line(0,1){3}}
\put(1142,0){\line(0,1){3}}
\put(1164,0){\line(0,1){3}}
\put(1187,0){\line(0,1){3}}
\put(1209,0){\line(0,1){5}}
\put(1231,0){\line(0,1){5}}
\put(1254,0){\line(0,1){11}}
\put(1276,0){\line(0,1){3}}
\put(1299,0){\line(0,1){3}}
\put(1321,0){\line(0,1){3}}
\put(1343,0){\line(0,1){5}}
\put(1366,0){\line(0,1){32}}
\put(1388,0){\line(0,1){8}}
\put(1410,0){\line(0,1){3}}
\put(1433,0){\line(0,1){3}}
\put(1455,0){\line(0,1){3}}
\put(1478,0){\line(0,1){26}}
\end{picture}

{\smaller
\begin{tabular}{ rrr }
n&missing&distinct \\
173&0&67 \end{tabular}
\begin{verbatim}

lowest : [b, p, e, y]    [b, u]          [b]              [e, n, p, w]    [e, n, y]
highest: [y, n]          [y, o, g, n, r] [y, o, r, n]    [y, o]          [y]
\end{verbatim}
}
\smallskip\hrule\smallskip
}
\vbox{\noindent\textbf{does.bruise.or.bleed}

{\smaller
\begin{tabular}{ rrr }
n&missing&distinct \\
173&0&2 \end{tabular}
\begin{verbatim}

Value        [f]    [t]
Frequency    143     30
Proportion 0.827 0.173
\end{verbatim}
}
\smallskip\hrule\smallskip
}
\vbox{\noindent\textbf{gill.attachment}\setlength{\unitlength}{0.001in}\hfill\begin{picture}(1.5,.1)(150
\put(0,0){\line(0,1){88}}
\put(167,0){\line(0,1){25}}
\put(333,0){\line(0,1){100}}
\put(500,0){\line(0,1){78}}
\put(667,0){\line(0,1){50}}
```

```
\put(833,0){\line(0,1){31}}
\put(1000,0){\line(0,1){53}}
\put(1167,0){\line(0,1){50}}
\put(1333,0){\line(0,1){66}}
\end{picture}

{\smaller
\begin{tabular}{ rrr }
n&missing&distinct \\
173&0&9 \end{tabular}
\begin{verbatim}

Value            [a, d]     [a]     [d]     [e]     [f]     [p]     [s]     [x]
Frequency        28       8      32      25      16      10      17      16      21
Proportion  0.162   0.046   0.185   0.145   0.092   0.058   0.098   0.092   0.121
\end{verbatim}
}
\smallskip\hrule\smallskip
}
\vbox{\noindent\textbf{gill.spacing}\setlength{\unitlength}{0.001in}\hfill\begin{picture}(1.5,.1)(1500,0
\put(0,0){\line(0,1){100}}
\put(375,0){\line(0,1){99}}
\put(750,0){\line(0,1){31}}
\put(1125,0){\line(0,1){14}}
\end{picture}

{\smaller
\begin{tabular}{ rrr }
n&missing&distinct \\
173&0&4 \end{tabular}
\begin{verbatim}

Value            [c]     [d]     [f]
Frequency     71      70      22      10
Proportion 0.410 0.405 0.127 0.058
\end{verbatim}
}
\smallskip\hrule\smallskip
}
\vbox{\noindent\textbf{gill.color}\setlength{\unitlength}{0.001in}\hfill\begin{picture}(1.5,.1)(1500,0)\
\put(0,0){\line(0,1){3}}
\put(25,0){\line(0,1){3}}
\put(51,0){\line(0,1){3}}
\put(76,0){\line(0,1){3}}
\put(102,0){\line(0,1){28}}
\put(127,0){\line(0,1){6}}
\put(153,0){\line(0,1){3}}
\put(178,0){\line(0,1){8}}
\put(203,0){\line(0,1){3}}
\put(229,0){\line(0,1){3}}
\put(254,0){\line(0,1){3}}
\put(280,0){\line(0,1){3}}
\put(305,0){\line(0,1){6}}
```

```
\put(331,0){\line(0,1){11}}
\put(356,0){\line(0,1){17}}
\put(381,0){\line(0,1){3}}
\put(407,0){\line(0,1){3}}
\put(432,0){\line(0,1){3}}
\put(458,0){\line(0,1){6}}
\put(483,0){\line(0,1){3}}
\put(508,0){\line(0,1){3}}
\put(534,0){\line(0,1){6}}
\put(559,0){\line(0,1){6}}
\put(585,0){\line(0,1){31}}
\put(610,0){\line(0,1){3}}
\put(636,0){\line(0,1){6}}
\put(661,0){\line(0,1){14}}
\put(686,0){\line(0,1){11}}
\put(712,0){\line(0,1){3}}
\put(737,0){\line(0,1){3}}
\put(763,0){\line(0,1){14}}
\put(788,0){\line(0,1){3}}
\put(814,0){\line(0,1){3}}
\put(839,0){\line(0,1){22}}
\put(864,0){\line(0,1){3}}
\put(890,0){\line(0,1){3}}
\put(915,0){\line(0,1){3}}
\put(941,0){\line(0,1){3}}
\put(966,0){\line(0,1){3}}
\put(992,0){\line(0,1){3}}
\put(1017,0){\line(0,1){3}}
\put(1042,0){\line(0,1){3}}
\put(1068,0){\line(0,1){14}}
\put(1093,0){\line(0,1){3}}
\put(1119,0){\line(0,1){8}}
\put(1144,0){\line(0,1){3}}
\put(1169,0){\line(0,1){3}}
\put(1195,0){\line(0,1){3}}
\put(1220,0){\line(0,1){14}}
\put(1246,0){\line(0,1){100}}
\put(1271,0){\line(0,1){3}}
\put(1297,0){\line(0,1){3}}
\put(1322,0){\line(0,1){3}}
\put(1347,0){\line(0,1){14}}
\put(1373,0){\line(0,1){3}}
\put(1398,0){\line(0,1){3}}
\put(1424,0){\line(0,1){3}}
\put(1449,0){\line(0,1){3}}
\put(1475,0){\line(0,1){36}}
\end{picture}

{\smaller
\begin{tabular}{ rrr }
n&missing&distinct \\
173&0&59 \end{tabular}
\begin{verbatim}
```

```
lowest : [b, p, w] [b, u]    [b]        [e]        [f]
highest: [y, o, e] [y, r, k] [y, r]     [y, w]     [y]
\end{verbatim}
}
\smallskip\hrule\smallskip
}
\vbox{\noindent\textbf{stem.height}\setlength{\unitlength}{0.001in}\hfill\begin{picture}(1.5,.1)(1500,0)
\put(0,0){\line(0,1){14}}
\put(33,0){\line(0,1){5}}
\put(65,0){\line(0,1){5}}
\put(98,0){\line(0,1){10}}
\put(130,0){\line(0,1){10}}
\put(163,0){\line(0,1){5}}
\put(196,0){\line(0,1){5}}
\put(228,0){\line(0,1){5}}
\put(261,0){\line(0,1){5}}
\put(293,0){\line(0,1){5}}
\put(326,0){\line(0,1){19}}
\put(359,0){\line(0,1){52}}
\put(391,0){\line(0,1){14}}
\put(424,0){\line(0,1){5}}
\put(457,0){\line(0,1){5}}
\put(489,0){\line(0,1){19}}
\put(522,0){\line(0,1){10}}
\put(554,0){\line(0,1){10}}
\put(587,0){\line(0,1){71}}
\put(620,0){\line(0,1){24}}
\put(652,0){\line(0,1){48}}
\put(685,0){\line(0,1){76}}
\put(717,0){\line(0,1){5}}
\put(750,0){\line(0,1){33}}
\put(783,0){\line(0,1){33}}
\put(815,0){\line(0,1){100}}
\put(848,0){\line(0,1){38}}
\put(880,0){\line(0,1){19}}
\put(913,0){\line(0,1){14}}
\put(946,0){\line(0,1){14}}
\put(978,0){\line(0,1){24}}
\put(1011,0){\line(0,1){5}}
\put(1043,0){\line(0,1){29}}
\put(1076,0){\line(0,1){19}}
\put(1109,0){\line(0,1){5}}
\put(1141,0){\line(0,1){14}}
\put(1174,0){\line(0,1){5}}
\put(1207,0){\line(0,1){5}}
\put(1239,0){\line(0,1){5}}
\put(1272,0){\line(0,1){5}}
\put(1304,0){\line(0,1){5}}
\put(1337,0){\line(0,1){10}}
\put(1370,0){\line(0,1){5}}
\put(1402,0){\line(0,1){5}}
\put(1435,0){\line(0,1){5}}
\put(1467,0){\line(0,1){5}}
```

```
\end{picture}

{\smaller
\begin{tabular}{ rrr }
n&missing&distinct \\
173&0&46 \end{tabular}
\begin{verbatim}

lowest : [0]      [1, 2]   [1, 3]   [10, 12] [10, 15], highest: [8, 12]  [8, 15]  [8, 20]  [8, 25]  [8,
\end{verbatim}
}
\smallskip\hrule\smallskip
}
\vbox{\noindent\textbf{stem.width}\setlength{\unitlength}{0.001in}\hfill\begin{picture}(1.5,.1)(1500,0)\
\put(0,0){\line(0,1){6}}
\put(31,0){\line(0,1){19}}
\put(62,0){\line(0,1){31}}
\put(94,0){\line(0,1){6}}
\put(125,0){\line(0,1){19}}
\put(156,0){\line(0,1){94}}
\put(188,0){\line(0,1){12}}
\put(219,0){\line(0,1){100}}
\put(250,0){\line(0,1){19}}
\put(281,0){\line(0,1){6}}
\put(312,0){\line(0,1){6}}
\put(344,0){\line(0,1){25}}
\put(375,0){\line(0,1){6}}
\put(406,0){\line(0,1){56}}
\put(438,0){\line(0,1){38}}
\put(469,0){\line(0,1){25}}
\put(500,0){\line(0,1){6}}
\put(531,0){\line(0,1){56}}
\put(562,0){\line(0,1){38}}
\put(594,0){\line(0,1){12}}
\put(625,0){\line(0,1){6}}
\put(656,0){\line(0,1){6}}
\put(688,0){\line(0,1){38}}
\put(719,0){\line(0,1){38}}
\put(750,0){\line(0,1){6}}
\put(781,0){\line(0,1){6}}
\put(812,0){\line(0,1){6}}
\put(844,0){\line(0,1){19}}
\put(875,0){\line(0,1){12}}
\put(906,0){\line(0,1){12}}
\put(938,0){\line(0,1){6}}
\put(969,0){\line(0,1){25}}
\put(1000,0){\line(0,1){6}}
\put(1031,0){\line(0,1){6}}
\put(1062,0){\line(0,1){6}}
\put(1094,0){\line(0,1){12}}
\put(1125,0){\line(0,1){50}}
\put(1156,0){\line(0,1){6}}
\put(1188,0){\line(0,1){81}}
```

```
\put(1219,0){\line(0,1){6}}
\put(1250,0){\line(0,1){31}}
\put(1281,0){\line(0,1){12}}
\put(1312,0){\line(0,1){31}}
\put(1344,0){\line(0,1){6}}
\put(1375,0){\line(0,1){31}}
\put(1406,0){\line(0,1){19}}
\put(1438,0){\line(0,1){6}}
\put(1469,0){\line(0,1){6}}
\end{picture}

{\smaller
\begin{tabular}{ rrr }
n&missing&distinct \\
173&0&48 \end{tabular}
\begin{verbatim}

lowest : [0.5, 1] [0]     [1, 2]   [1, 3]   [1]     , highest: [7, 15]  [8, 12]  [8, 15]  [8, 18]  [8,
\end{verbatim}
}
\smallskip\hrule\smallskip
}
\vbox{\noindent\textbf{stem.root}\setlength{\unitlength}{0.001in}\hfill\begin{picture}(1.5,.1)(1500,0)\l
\put(0,0){\line(0,1){100}}
\put(250,0){\line(0,1){6}}
\put(500,0){\line(0,1){1}}
\put(750,0){\line(0,1){2}}
\put(1000,0){\line(0,1){3}}
\put(1250,0){\line(0,1){6}}
\end{picture}

{\smaller
\begin{tabular}{ rrr }
n&missing&distinct \\
173&0&6 \end{tabular}
\begin{verbatim}

Value               [b]    [c]    [f]    [r]    [s]
Frequency    146     9      2      3      4      9
Proportion 0.844 0.052 0.012 0.017 0.023 0.052
\end{verbatim}
}
\smallskip\hrule\smallskip
}
\vbox{\noindent\textbf{stem.surface}\setlength{\unitlength}{0.001in}\hfill\begin{picture}(1.5,.1)(1500,0
\put(0,0){\line(0,1){100}}
\put(100,0){\line(0,1){3}}
\put(200,0){\line(0,1){5}}
\put(300,0){\line(0,1){1}}
\put(400,0){\line(0,1){1}}
\put(500,0){\line(0,1){1}}
\put(600,0){\line(0,1){1}}
\put(700,0){\line(0,1){10}}
```

```
\put(800,0){\line(0,1){1}}
\put(900,0){\line(0,1){4}}
\put(1000,0){\line(0,1){1}}
\put(1100,0){\line(0,1){14}}
\put(1200,0){\line(0,1){6}}
\put(1300,0){\line(0,1){1}}
\put(1400,0){\line(0,1){12}}
\end{picture}

{\smaller
\begin{tabular}{ rrr }
n&missing&distinct \\
173&0&15 \end{tabular}
\begin{verbatim}

Value                 [f]     [g]     [h] [i, s] [i, t] [i, y]     [i] [k, s]     [k] [s, h]     [s]
Frequency     108       3       5       1       1       1       1      11       1       4       1      15
Proportion  0.624   0.017   0.029   0.006   0.006   0.006   0.006   0.064   0.006   0.023   0.006   0.087

Value         [t] [y, s]     [y]
Frequency       7       1      13
Proportion  0.040   0.006   0.075
\end{verbatim}
}
\smallskip\hrule\smallskip
}
\vbox{\noindent\textbf{stem.color}\setlength{\unitlength}{0.001in}\hfill\begin{picture}(1.5,.1)(1500,0)\
\put(0,0){\line(0,1){2}}
\put(37,0){\line(0,1){5}}
\put(73,0){\line(0,1){2}}
\put(110,0){\line(0,1){2}}
\put(146,0){\line(0,1){2}}
\put(183,0){\line(0,1){5}}
\put(220,0){\line(0,1){2}}
\put(256,0){\line(0,1){7}}
\put(293,0){\line(0,1){4}}
\put(329,0){\line(0,1){2}}
\put(366,0){\line(0,1){4}}
\put(402,0){\line(0,1){4}}
\put(439,0){\line(0,1){4}}
\put(476,0){\line(0,1){2}}
\put(512,0){\line(0,1){2}}
\put(549,0){\line(0,1){4}}
\put(585,0){\line(0,1){4}}
\put(622,0){\line(0,1){4}}
\put(659,0){\line(0,1){2}}
\put(695,0){\line(0,1){2}}
\put(732,0){\line(0,1){5}}
\put(768,0){\line(0,1){4}}
\put(805,0){\line(0,1){61}}
\put(841,0){\line(0,1){2}}
\put(878,0){\line(0,1){2}}
\put(915,0){\line(0,1){9}}
```

```
\put(951,0){\line(0,1){2}}
\put(988,0){\line(0,1){4}}
\put(1024,0){\line(0,1){2}}
\put(1061,0){\line(0,1){2}}
\put(1098,0){\line(0,1){4}}
\put(1134,0){\line(0,1){2}}
\put(1171,0){\line(0,1){5}}
\put(1207,0){\line(0,1){2}}
\put(1244,0){\line(0,1){2}}
\put(1280,0){\line(0,1){5}}
\put(1317,0){\line(0,1){100}}
\put(1354,0){\line(0,1){2}}
\put(1390,0){\line(0,1){7}}
\put(1427,0){\line(0,1){2}}
\put(1463,0){\line(0,1){23}}
\end{picture}

{\smaller
\begin{tabular}{ rrr }
n&missing&distinct \\
173&0&41 \end{tabular}
\begin{verbatim}

lowest : [b, u]     [e, n]     [e, u, y] [e, y]     [e]
highest: [w]        [y, e, n] [y, n]     [y, o, k] [y]
\end{verbatim}
}
\smallskip\hrule\smallskip
}
\vbox{\noindent\textbf{veil.type}

{\smaller
\begin{tabular}{ rrr }
n&missing&distinct \\
173&0&2 \end{tabular}
\begin{verbatim}

Value             [u]
Frequency    164     9
Proportion 0.948 0.052
\end{verbatim}
}
\smallskip\hrule\smallskip
}
\vbox{\noindent\textbf{veil.color}\setlength{\unitlength}{0.001in}\hfill\begin{picture}(1.5,.1)(1500,0)\
\put(0,0){\line(0,1){100}}
\put(188,0){\line(0,1){1}}
\put(375,0){\line(0,1){1}}
\put(562,0){\line(0,1){1}}
\put(750,0){\line(0,1){1}}
\put(938,0){\line(0,1){10}}
\put(1125,0){\line(0,1){1}}
\put(1312,0){\line(0,1){1}}
```

```
\end{picture}

{\smaller
\begin{tabular}{ rrr }
n&missing&distinct \\
173&0&8 \end{tabular}
\begin{verbatim}

Value           [e, n]    [k]     [n]     [u]     [w] [y, w]     [y]
Frequency     152      1       1       1       1      15       1       1
Proportion  0.879  0.006   0.006   0.006   0.006   0.087   0.006   0.006
\end{verbatim}
}
\smallskip\hrule\smallskip
}
\vbox{\noindent\textbf{has.ring}

{\smaller
\begin{tabular}{ rrr }
n&missing&distinct \\
173&0&2 \end{tabular}
\begin{verbatim}

Value        [f]    [t]
Frequency    130    43
Proportion 0.751 0.249
\end{verbatim}
}
\smallskip\hrule\smallskip
}
\vbox{\noindent\textbf{ring.type}\setlength{\unitlength}{0.001in}\hfill\begin{picture}(1.5,.1)(1500,0)\1
\put(0,0){\line(0,1){5}}
\put(107,0){\line(0,1){1}}
\put(214,0){\line(0,1){4}}
\put(321,0){\line(0,1){100}}
\put(429,0){\line(0,1){1}}
\put(536,0){\line(0,1){1}}
\put(643,0){\line(0,1){1}}
\put(750,0){\line(0,1){1}}
\put(857,0){\line(0,1){1}}
\put(964,0){\line(0,1){1}}
\put(1071,0){\line(0,1){1}}
\put(1179,0){\line(0,1){1}}
\put(1286,0){\line(0,1){2}}
\put(1393,0){\line(0,1){4}}
\end{picture}

{\smaller
\begin{tabular}{ rrr }
n&missing&distinct \\
173&0&14 \end{tabular}
\begin{verbatim}
```

```
Value              [e, g]      [e]     [f] [g, p]     [g] [l, e] [l, p] [l, r]    [l]    [m]    [p]
Frequency          7        1       6    137       2       2      1      1      2      2      1      2
Proportion  0.040   0.006   0.035   0.792   0.012   0.012   0.006   0.006   0.012   0.012   0.006   0.012

Value         [r]    [z]
Frequency       3      6
Proportion  0.017  0.035
\end{verbatim}
}
\smallskip\hrule\smallskip
}
\vbox{\noindent\textbf{Spore.print.color}\setlength{\unitlength}{0.001in}\hfill\begin{picture}(1.5,.1)(1
\put(0,0){\line(0,1){100}}
\put(167,0){\line(0,1){1}}
\put(333,0){\line(0,1){1}}
\put(500,0){\line(0,1){1}}
\put(667,0){\line(0,1){3}}
\put(833,0){\line(0,1){2}}
\put(1000,0){\line(0,1){1}}
\put(1167,0){\line(0,1){2}}
\put(1333,0){\line(0,1){2}}
\end{picture}

{\smaller
\begin{tabular}{ rrr }
n&missing&distinct \\
173&0&9 \end{tabular}
\begin{verbatim}

Value              [g] [k, r] [k, u]    [k]    [n] [p, w]    [p]    [w]
Frequency      155     1      1      1      5      3      1      3      3
Proportion  0.896  0.006  0.006  0.006  0.029  0.017  0.006  0.017  0.017
\end{verbatim}
}
\smallskip\hrule\smallskip
}
\vbox{\noindent\textbf{habitat}\setlength{\unitlength}{0.001in}\hfill\begin{picture}(1.5,.1)(1500,0)\lin
\put(0,0){\line(0,1){4}}
\put(71,0){\line(0,1){100}}
\put(143,0){\line(0,1){1}}
\put(214,0){\line(0,1){10}}
\put(286,0){\line(0,1){3}}
\put(357,0){\line(0,1){1}}
\put(429,0){\line(0,1){1}}
\put(500,0){\line(0,1){5}}
\put(571,0){\line(0,1){5}}
\put(643,0){\line(0,1){1}}
\put(714,0){\line(0,1){11}}
\put(786,0){\line(0,1){2}}
\put(857,0){\line(0,1){1}}
\put(929,0){\line(0,1){12}}
\put(1000,0){\line(0,1){1}}
\put(1071,0){\line(0,1){1}}
```

```
\put(1143,0){\line(0,1){3}}
\put(1214,0){\line(0,1){1}}
\put(1286,0){\line(0,1){2}}
\put(1357,0){\line(0,1){2}}
\put(1429,0){\line(0,1){1}}
\end{picture}

{\smaller
\begin{tabular}{ rrr }
n&missing&distinct \\
173&0&21 \end{tabular}
\begin{verbatim}

lowest : [d, h]    [d]        [g, d, h] [g, d]     [g, h, d]
highest: [m, d]    [m, h]     [m]        [p, d]     [w]
\end{verbatim}
}
\smallskip\hrule\smallskip
}
\vbox{\noindent\textbf{season}\setlength{\unitlength}{0.001in}\hfill\begin{picture}(1.5,.1)(1500,0)\line
\put(0,0){\line(0,1){14}}
\put(150,0){\line(0,1){15}}
\put(300,0){\line(0,1){1}}
\put(450,0){\line(0,1){12}}
\put(600,0){\line(0,1){5}}
\put(750,0){\line(0,1){3}}
\put(900,0){\line(0,1){1}}
\put(1050,0){\line(0,1){11}}
\put(1200,0){\line(0,1){100}}
\put(1350,0){\line(0,1){1}}
\end{picture}

{\smaller
\begin{tabular}{ rrr }
n&missing&distinct \\
173&0&10 \end{tabular}
\begin{verbatim}

Value              [a, w]         [a]    [s, a, w] [s, u, a, w]    [s, u, a]        [s, u]
Frequency             15          16         1          13           5              3
Proportion         0.087       0.092      0.006       0.075       0.029          0.017

Value                 [s]   [u, a, w]     [u, a]         [u]
Frequency              1         12         106           1
Proportion         0.006      0.069       0.613       0.006
\end{verbatim}
}
\smallskip\hrule\smallskip
}
}\end{spacing}
```

二、Table one

```r
# Load necessary libraries
library(dplyr)
library(tableone)
library(knitr)
library(kableExtra)


# Define variables for Table One
vars <- c("class")  # Target variable for the table

# Create Table One summary
table1 <- CreateTableOne(vars = vars, data = primary_data)

# Convert table to LaTeX format for PDF output
table1_print <- print(table1, printToggle = FALSE)

# Display table in LaTeX format
kable(table1_print, format = "latex", booktabs = TRUE) %>%
  kable_styling(latex_options = c("striped", "hold_position"))
```

	Overall
n	173
class = p (%)	96 (55.5)