weheartprogramminginbaser

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Task 1: Basic Vector practice

Question 1

```
pre = c(130, 128, 116, 124, 133, 134, 118, 126, 114, 127, 141, 138,
        128, 140, 137, 131, 120, 128, 139, 135)
post = c(114, 98, 113, 99, 107, 116, 113, 111, 119, 117, 101, 119, 130,
         122, 106, 106, 124, 102, 117, 113)
```

Question 2

```
naming = paste("Subject", 1:20, sep = "_")
names(pre) = naming
names(post) = naming
```

Question 3

```
diff_op = pre - post
diff_op
```

```
 Subject_1  Subject_2  Subject_3  Subject_4  Subject_5  Subject_6  Subject_7
        16         30          3         25         26         18          5
 Subject_8  Subject_9 Subject_10 Subject_11 Subject_12 Subject_13 Subject_14
        15         -5         10         40         19         -2         18
Subject_15 Subject_16 Subject_17 Subject_18 Subject_19 Subject_20
        31         25         -4         26         22         22
```

Question 4

```
mean(as.numeric(diff_op))
```

```
[1] 17
```

The average decrease in blood pressure across all patients is 17 units

Question 5

```
which(diff_op > 0)
```

```
 Subject_1  Subject_2  Subject_3  Subject_4  Subject_5  Subject_6  Subject_7
         1          2          3          4          5          6          7
 Subject_8 Subject_10 Subject_11 Subject_12 Subject_14 Subject_15 Subject_16
         8         10         11         12         14         15         16
Subject_18 Subject_19 Subject_20
        18         19         20
```

Question 6

```
pos_diff = diff_op[diff_op > 0]
pos_diff
```

```
 Subject_1  Subject_2  Subject_3  Subject_4  Subject_5  Subject_6  Subject_7
        16         30          3         25         26         18          5
 Subject_8 Subject_10 Subject_11 Subject_12 Subject_14 Subject_15 Subject_16
        15         10         40         19         18         31         25
Subject_18 Subject_19 Subject_20
        26         22         22
```

Question 7

```
mean(pos_diff)
```

```
[1] 20.64706
```

The average decrease in blood pressure for those where the blood pressure decreased was 20.65

Task 2: Basic Vector practice

Question 1

```
data = data.frame(patient=naming,pre_bp=pre, post_bp=post, diff_bp=diff_op,
row.names = NULL)
```

Question 2

```
subset(data,data$diff_bp<0)
```

```
      patient pre_bp post_bp diff_bp
9   Subject_9    114     119      -5
13 Subject_13    128     130      -2
17 Subject_17    120     124      -4
```

Question 3

```
data$postunder120 = (data$post_bp < 120)
```

Question 4

```
knitr::kable(data)
```

patient	pre_bp	post_bp	diff_bp	postunder120
Subject_1	130	114	16	TRUE
Subject_2	128	98	30	TRUE
Subject_3	116	113	3	TRUE
Subject_4	124	99	25	TRUE
Subject_5	133	107	26	TRUE
Subject_6	134	116	18	TRUE
Subject_7	118	113	5	TRUE
Subject_8	126	111	15	TRUE
Subject_9	114	119	-5	TRUE
Subject_10	127	117	10	TRUE
Subject_11	141	101	40	TRUE
Subject_12	138	119	19	TRUE
Subject_13	128	130	-2	FALSE
Subject_14	140	122	18	FALSE
Subject_15	137	106	31	TRUE
Subject_16	131	106	25	TRUE
Subject_17	120	124	-4	FALSE
Subject_18	128	102	26	TRUE
Subject_19	139	117	22	TRUE
Subject_20	135	113	22	TRUE

Task 3: List Practice

Question 1

```
pret3 = c(138, 135, 147, 117, 152, 134, 114, 121, 131, 130)
postt3 = c(105, 136, 123, 130, 134, 143, 135, 139, 120, 124)
namingt3 = paste("Subject", 1:10, sep = "_")
difft3 = pret3 - postt3
bp_df_placebo = data.frame(patient = namingt3, pre_bp = pret3,
post_bp = postt3, diff_bp = difft3 )
bp_df_placebo$normal = (bp_df_placebo$post < 120)
```

Question 2

```
bp_list = list(treatment = data, placebo = bp_df_placebo)
```

Question 3: Access the first list element using three different types of syntax.

```
#Method 1
bp_list[1]
```

```
$treatment
      patient pre_bp post_bp diff_bp postunder120
1   Subject_1    130     114      16         TRUE
2   Subject_2    128      98      30         TRUE
3   Subject_3    116     113       3         TRUE
4   Subject_4    124      99      25         TRUE
5   Subject_5    133     107      26         TRUE
6   Subject_6    134     116      18         TRUE
7   Subject_7    118     113       5         TRUE
8   Subject_8    126     111      15         TRUE
9   Subject_9    114     119      -5         TRUE
10 Subject_10    127     117      10         TRUE
11 Subject_11    141     101      40         TRUE
12 Subject_12    138     119      19         TRUE
13 Subject_13    128     130      -2        FALSE
14 Subject_14    140     122      18        FALSE
15 Subject_15    137     106      31         TRUE
16 Subject_16    131     106      25         TRUE
17 Subject_17    120     124      -4        FALSE
18 Subject_18    128     102      26         TRUE
19 Subject_19    139     117      22         TRUE
20 Subject_20    135     113      22         TRUE
```

```
#Method 2
bp_list[[1]]
```

```
      patient pre_bp post_bp diff_bp postunder120
1   Subject_1    130     114      16         TRUE
2   Subject_2    128      98      30         TRUE
3   Subject_3    116     113       3         TRUE
4   Subject_4    124      99      25         TRUE
5   Subject_5    133     107      26         TRUE
6   Subject_6    134     116      18         TRUE
7   Subject_7    118     113       5         TRUE
8   Subject_8    126     111      15         TRUE
```

```
9   Subject_9    114     119      -5         TRUE
10 Subject_10    127     117      10         TRUE
11 Subject_11    141     101      40         TRUE
12 Subject_12    138     119      19         TRUE
13 Subject_13    128     130      -2        FALSE
14 Subject_14    140     122      18        FALSE
15 Subject_15    137     106      31         TRUE
16 Subject_16    131     106      25         TRUE
17 Subject_17    120     124      -4        FALSE
18 Subject_18    128     102      26         TRUE
19 Subject_19    139     117      22         TRUE
20 Subject_20    135     113      22         TRUE
```

```
#Method 3
bp_list$treatment
```

```
      patient pre_bp post_bp diff_bp postunder120
1   Subject_1    130     114      16         TRUE
2   Subject_2    128      98      30         TRUE
3   Subject_3    116     113       3         TRUE
4   Subject_4    124      99      25         TRUE
5   Subject_5    133     107      26         TRUE
6   Subject_6    134     116      18         TRUE
7   Subject_7    118     113       5         TRUE
8   Subject_8    126     111      15         TRUE
9   Subject_9    114     119      -5         TRUE
10 Subject_10    127     117      10         TRUE
11 Subject_11    141     101      40         TRUE
12 Subject_12    138     119      19         TRUE
13 Subject_13    128     130      -2        FALSE
14 Subject_14    140     122      18        FALSE
15 Subject_15    137     106      31         TRUE
16 Subject_16    131     106      25         TRUE
17 Subject_17    120     124      -4        FALSE
18 Subject_18    128     102      26         TRUE
19 Subject_19    139     117      22         TRUE
20 Subject_20    135     113      22         TRUE
```

Question 4

```
bp_list$placebo$pre
```

```
 [1] 138 135 147 117 152 134 114 121 131 130
```

Task 4

Question 1

```
data$status <- character(20)
bp_df_placebo$status <- character(10)
```

Question 2

```
for (i in 1:20) {
  if(bp_list$treatment$post_bp[i] <= 120) {
   bp_list$treatment$status[i] = "optimal"
  } else if(bp_list$treatment$post_bp[i] < 130) {
    bp_list$treatment$status[i] = "borderline"
  } else {
    bp_list$treatment$status[i] = "high"
  }
}
```

Question 3

```
for (i in 1:10) {
  if(bp_list$placebo$post_bp[i] <= 120) {
   bp_list$placebo$status[i] = "optimal"
  } else if(bp_list$placebo$post_bp[i] < 130) {
    bp_list$placebo$status[i] = "borderline"
  } else {
    bp_list$placebo$status[i] = "high"
  }
}
```

Task 5

Question 1

```
bp_fun = function(bp_list, stat="mean") {
 # get the function from the quoted string
  my_fun = get(stat)

  treatment = bp_list$treatment
  placebo = bp_list$placebo

  stat_vector = c(my_fun(treatment$pre), my_fun(treatment$post_bp),
  my_fun(treatment$diff), my_fun(placebo$pre),
my_fun(placebo$post), my_fun(placebo$diff))
   # vector of names that is created dynamically based on the statistic passed
  name_vector = c("pre_trt_bp","post_trt_bp","diff_trt_bp",
  "pre_plac_bp","post_plac_bp","diff_plac_bp")
  names(stat_vector) = name_vector

  return(stat_vector)
}
```

```
# applying function without specifying stat
bp_fun(bp_list)
```

```
  pre_trt_bp  post_trt_bp  diff_trt_bp  pre_plac_bp post_plac_bp diff_plac_bp
      129.35       112.35        17.00       131.90       128.90         3.00
```

```
# applying function to other specified stat values
bp_fun(bp_list, stat="var")
```

```
  pre_trt_bp  post_trt_bp  diff_trt_bp  pre_plac_bp post_plac_bp diff_plac_bp
    64.55526     74.76579    153.68421    149.87778    124.98889    341.33333
```

```
bp_fun(bp_list, stat="sd")
```

```
  pre_trt_bp  post_trt_bp  diff_trt_bp  pre_plac_bp post_plac_bp diff_plac_bp
    8.034629     8.646721    12.396944    12.242458    11.179843    18.475209
```

```r
bp_fun(bp_list, stat="min")
```

```
  pre_trt_bp  post_trt_bp  diff_trt_bp  pre_plac_bp post_plac_bp diff_plac_bp
         114           98           -5          114          105          -21
```

```r
bp_fun(bp_list, stat="max")
```

```
  pre_trt_bp  post_trt_bp  diff_trt_bp  pre_plac_bp post_plac_bp diff_plac_bp
         141          130           40          152          143           33
```